ENDEMIC FEVER IN LOWER BENGAL.

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Few subjects have received so much attention in late years as the endemic fever in Lower Bengal; and, with the exception of cholera, I do not think there is another disease concerning which so many reports have been written, or of the nature or cause of which so many opinions exist. Reports on the subject may be found in most of the offices, or have been published in the Gazettes; but the labor of searching for them, or of wading through them, is so great, that I purpose to give a *resumé* of the most important of them,—to put together a brief history of the fever, curtly detail the relief measures adopted, and then add a few remarks based on my own observations during the past year while acting as Civil Surgeon of Burdwan. Some men, when writing on a "hackneyed" subject, generally commence by offering an apology. I might do so, and very likely the handling of my subject may warrant one; but the general interest which not only the profession, but the public generally, attach to the Burdwan fever, makes me think that such is unnecessary. Should any one imagine that he will meet with anything new, or hear of any recent discovery, he will be disappointed. My observations merely tend to corroborate the opinion of others who have gone before me. I have headed my paper the *Endemic Fever in Lower Bengal*, which, from the widespread nature of the disease, is, I think, a more appropriate name than that of the "Burdwan fever." In former days it might have been called the Presidency fever, now the Burdwan fever, and

hereafter, perhaps, th[redacted]gpore or Patna fever, according to the Commissioner [redacted] in which it is most prevalent. We have heard of the Assam fever, the Burmah fever, the Mauritius fever, and that of other places. Calling a fever by the name of the *place* in which it is raging, is certainly objectionable; but as the "Burdwan fever" has obtained an European notoriety, I shall call it by this name in the following pages.

The following is a list of the most important reports on the subject, of which I have made extensive use:—

(a.)—Report on epidemic fever in Nuddea, Baraset, Hooghly, and Burdwan, by Dr. John Elliot, dated Hooghly, 18th March 1863.

(b.)—Report dated January 1864, by a Commission appointed by Government to enquire into the nature and probable causes of the epidemic.

(c.)—No. 51 of 13th April 1868, by Dr. John Sutherland, Deputy Inspector-General of Hospitals, Presidency Circle.

(d.)—No. 253 of the 12th May 1870, by Dr. D. B. Smith, Sanitary Commissioner for Bengal.

(e.)—Reports by Engineer Officers published in Supplement to *Calcutta Gazette* of the 28th April 1869.

(f.)—Reports published in *Calcutta Gazette* of the 2nd March 1870.

(g.)—No. 17P of 17th January 1870, from W. E. Ward, Esq., Magistrate of Burdwan.

(h.)—No. 50 of 25th May 1871, from W. E. Ward, Esq., Magistrate of Burdwan.

(i.)—No. 19D of 24th May 1872, by George Saunders, Esq., Deputy Inspector-General of Hospitals, Presidency Circle.

(j.)—No. 205P of 28th June 1872, from C. T. Metcalfe, Esq., Magistrate of Burdwan.

In these and other reports, the fever has been traced from the year 1824, when, it is said, it broke out in Mahomedpore

30 miles from Jessore. In 1833 or 1832, it passed over from Jessore to Nuddea, "attacking first the large and then populous village of Gudkally." It spread to some of the neighbouring villages in the succeeding five or six years. In 1840, Gudkally, from which the fever had disappeared for some time, was again attacked. In 1845-46, it spread to the large village of Sreenuggur, 25 miles to the south-west of Gudkally. It then spread south and west until it reached Oolah in 1856. In the rains of 1857 it attacked Chogda on the river Hooghly. Along this river it went further south to Kanchrapara, which it reached in 1859, and then extended to Nyhatti, opposite to Chinsurah. In 1859, we find it on the western side of the Bagharkhal in villages in Baraset. It appeared in the station of Baraset in 1860. In the same year it raged also in Trebani, in Hooghly district, and "through a long line of villages as far as Rajahati, in the 24-Pergunnahs." In 1861, it extended in a northerly direction to Balagurh. From this latter place and adjoining villages, it extended to Pundooah in July 1862. In the same year it entered the Burdwan district from Nuddea, directly across the Bhagiruthee river to Poorbusthulli. These two places acted as centres from which the fever spread over the Burdwan district. In 1862, the villages which suffered most were Poorbusthulli, Chupi, Bhandatikuri, Purulia, Shrikistopore, Salunto, Brajnagur, Puranpur, Kasthoshali, and Akdala. In Hooghly district, Pundooah, Balagurh, and Gooptipara suffered very severely.

The first intimation of the existence of the fever in the Burdwan district was conveyed in a petition to Government from the inhabitants of Poorbusthulli. It was sent in at the close of December 1862, and the petitioners stated that their own and the adjacent villages were almost depopulated, and they prayed for medical relief.

During the rains of 1863, Culna was attacked. The fever appeared to advance south-westward from Poorbusthulli, and

westward from Gooptipara. The villages of Ambica, Gram Culna, and Hanspokuria suffered in this year. In 1864 and 1865 there appears to have been a lull; the fever was generally confined to those villages in which it had appeared in previous years, and nearly died out in Culna. In these years the fever raged chiefly on both sides of the Hooghly river, from Kanchrapara in the south to Nuddea and Poorbusthulli in the north. It is important to observe that Barrackpore, Chandernagore, and other populous places escaped. The inhabitants of the village Ghose, situated about five miles from Mymaree railway station, stated that the fever appeared in their village after the cyclone of 1864. (Report by A. A. Mantell, M.D.) In July 1866, the fever again broke out at Culna and in the adjacent villages; but it was said that it was not so fatal as that which appeared in 1862-63. During the rains of this year we find it further to the westward and south. It attacked the villages of Kattalgatcha and Mohesdanga, about 16 miles from Culna, and the village of Oolora, four miles from Mymaree. In the last-named village the fever was very fatal, and the place was said to have been almost depopulated. Further on in the season, it appeared in Echapore, Gangooria, and Satgachia—all in Thanna Gangooria. In January 1867, the fever abated in these places; but in April, a police report was received stating that fever was again raging violently in the villages in Thanna Gangooria, particularly in Ghose and Kalshee. In the rains of this year, the fever spread in Thannas Gangooria, Selimabad, Sahibgunge, Mungulcote, and Burdwan. In Thanna Gangooria, the following villages were attacked:—Ghose, Oolora, Echapore, Gangooria, Satgachia, Mohesdanga, Mymaree, Bamonpara, Amadpore, Gowripore, Debipur, Poongram, Andon, Kejah, and Bohar. In Thanna Selimabad, the villages of Jowgram, Abujhatee, Elamdanga, Koolingram, Betraguria, and Chotekhund. In Thanna Sahibgunge, the villages of Mahatun, Kanpur, Ram-

chunderpore, Radhanagur, Norpore, and Gopalpur. In Thanna Mungulcote, the villages of Shookipokur, Darshini, and Pulshonar. In the end of the year 1867, it appeared in village Ganghur, about five miles from Burdwan. In this year it appears to have considerably abated in Poorbusthulli and adjacent villages. A statement showing the mortality was compiled by the police. The statement for the Thanna of Selimabad contains the returns from 59 villages, and is up to 26th November 1867. It gives the population at 49,725, the number of deaths at 884, and the number then sick at 14,057. In the villages round Mymaree we find that the death-rate in

Echapore, with a population of			732,	was	2 in	7
Mymaree	„	„	789	„	1 „	7
Bamoonpara	„	„	211	„	1 „	6
Radhakantpur	„	„	460	„	1 „	9
Gowripore	„	„	1,062	„	1 „	13
Bursan	„	„	781	„	1 „	13
Sreethurpur	„	„	728	„	1 „	16

All these villages are within six or eight miles of Mymaree. Going further away from this centre, the death-rate decreased, so that in Bahabpur there was on an average 1 death in 17; in Baglay 1 in 18; in Hurkola and Kulushpur 1 in 21; in Amadpur, with a population of 2,343, there was 1 in 24. There were four villages with 1 death in from 30—40, six villages with 1 death in from 40—50, four with 1 death in 50—60, and 1 in which the average was 1 per cent. There were, however, some villages near Mymaree in which the mortality was less than in those at agreater distance. Thus, we find in Kalshee, the death-rate was 1 in 24, in Gangooria 1 in 26, and Debipur 1 in 40. In Betraguria, Thanna Selimabad, out of a population of 480, there had died 149, and 112 were lying sick on 26th November. The total deaths up to that time in this village alone amounted to about 300 per 1,000. In the police statement, giving the

mortality in 37 villages within a distance of 10 or 12 miles from Mymaree up to 20th November 1867, the population is put down at 13,971, and the total number of deaths from fever at 1,259, or about 1 in 11. It is thus apparent that the villages in Thanna Gangooria, and chiefly those about Mymaree, bore the brunt of the attack in this year; and that the mortality in other places in the other Thannas attacked, amounted to about 1 in 64 only. In the cold weather, sickness abated everywhere, and the fever declined. In this year the fever broke out as early as April: about the middle of August it widely spread north, south, and west; and the greatest mortality was in September and October. The year 1868 was much more healthy than its predecessor. Fever was particularly bad in Selimabad during the rains and commencement of the cold weather; in villages of Thannas Gangooria and Sahibgunge, particularly in village Tenloodha, and also in Debipur. In October and November there was unusual sickness in Cutwa and Mungulcote; but the Sub-Assistant Surgeon reported that "it was in no way contagious, but simply of a malarious origin, and such as generally breaks out after the cessation of the rains and commencement of the cold weather." In his report of 7th November, he stated that "fever is no longer raging in the town of Cutwa." It was also observed that towards the end of the year more fever cases than usual were met with in the suburbs of the town of Burdwan. In this year the first six months were healthy, the latter six unhealthy. In the next year (1869) we find the same history,—the people in the first-half of the year comparatively free from fever, and in the second-half suffering a good deal. It continued in its old haunts in Thannas Gangooria, Selimabad, and Sahibgunge; was virulent in Mungulcote and adjoining villages; and showed itself decidedly in the town of Burdwan. On 17th May the Commissioner called for reports as to where the fever was prevailing. The

Deputy Magistrate of Cutwa replied that [redacted]was then no fever in his subdivision." The Deputy Ma[redacted]rate of Culna replied that, with the exception of Boddipur, Meerhat, and a few adjacent villages, all places were healthy. The District Superintendent of Police replied that there was no unusual sickness except in Thannas Selimabad and Gangooria.

In the rains of 1869, the fever again broke out chiefly in its former haunts. On 17th June the Magistrate recommended the opening of dispensaries at Jowgram, Bohar, Selimabad, and Amadpore near Mymaree. These four dispensaries were opened in August. In Cutwa and Mungulcote the virulence of the disease was greater than in the previous year, but it was milder in Selimabad, Gangooria, and Sahibgunge Thannas. In Mungulcote about 1 in 12 persons was sick in November. The increase of sickness reached its maximum about October and November, and the number of cases steadily decreased from December. In No. 17P of 17th February 1870, the Magistrate wrote as follows:—"I may add that the people in the affected districts are now suffering only from relapses of the old fever and its sequelæ. As a rule, deaths are rare, and it is clear that the exciting cause of the endemic fever, whatever that cause may have been, has passed away. In the town of Burdwan fever broke out with violence."

In report dated 24th May, the Civil Surgeon writes "that, during the last two or three years, fever of a more virulent type than the ordinary malarious fever had appeared in Burdwan." About middle of July, the "fever which had prevailed in the town for some two months past, but not to such an extent as to cause any alarm, assumed a more virulent aspect." At the commencement of August it became known to the Magistrate that the sickness was unusual. In the village of "Seraitikur, lying immediately outside municipal limits, 100 persons had been attacked with fever, of whom 40 had died, and 60 were

lingering." In September, the Chairman to the Municipal Commissioners stated that great sickness from fever was prevailing in the town, and more particularly in Chota Nilpore, Dhamria, Shakareepokur, Burra Nilpore, Itchlabazar, Sealdanga, and Lacoordee within the municipal limits. "Ten per cent. of the population had been carried off within the last two months." "The fever appeared to spread itself with more or less virulence all over the town; at the same time in no portion of the town was the fever so fatal as in the villages above-mentioned, where it first appeared, and in the villages of Godda, Kajanbeer, Meerbaer, and Juggutbaer." In December "the fever showed some signs of being on the decrease." In the commencement of February, the health of the people had so far improved that medical relief was withdrawn from 24 villages. Mr. W. E. Ward, in his Report No. 50 of 25th May 1870, states that "there is scarcely a native in the town who has not suffered from this fever." "In round numbers the population may be taken at 48,000. Out of this number I estimate roughly that, between the 1st April 1869 and the 31st March 1870, some 6,000, or one-eighth of the population, must have died; and of these, 80 per cent. must have died from fever." Further on he says:— "It is not easy for any person who did not reside in Burdwan during the period the fever was at its height to realize the state of utter helplessness to which the people were then reduced. . . . . I was fairly driven out of head-quarters for want of servants, and proceeded to Raneegunge. . . . It was cruel to attempt to induce any more servants to come from Calcutta. . . . . The fever has not also spared the European residents of the town, amongst whom relapses are, even now, of frequent occurrence." Rich and poor suffered alike, but the former recovered more quickly. In this year (1870) matters considerably improved in the early months of the year, and continued to do so up to October. In letter

days between Kalikapore and Poorbusthulli. The fever was spoken of as a thing of the past. New houses are springing up in places of the old, jungle is being cut down, new ryots are coming in and squatting; I am not speaking of one place only, but of a line from Poorbusthulli through Somoodagur to Culna." . . . . . "I have yet to visit and see the state of Jehanabad and Selimabad Thannahs; but with these exceptions I have been the entire circle of the district, and I nowhere see the misery or the sickness of last year" (1871).

In Midnapore in 1872, the fever again appeared in Dasspore Thannah, and spread southwards. In Beerbhoom it raged in the whole of the south and south-east. It reappeared in those villages which it had attacked in previous years, but it undoubtedly spread north-east and south-west.

Burdwan, 1873.—In January the severity of the fever had decreased everywhere, and instead of being generally of the quotidian it assumed the tertian and quartan types. The appearance of the people, particularly the well-to-do or comfortable classes, improved. The cases chiefly met with were those of chronic fever, spleen, anasarca, and dysentery. In February I reported "a general and gradual improvement in the health of the inhabitants of the district. There is no new outbreak of endemic fever anywhere, but still in affected villages, particularly those in which sanitary arrangements are altogether discarded, many cases of sickness are to be met with." From the 7th of March, there was an increase of fever all over the district and in the town. Relapses of fever in old cases were very common, and some new cases of continued and remittent fever, in the persons of those who had never before suffered, were met with in each circle. At Bhedia near Pogram, Surgeon B. B. Gupta, M.B., saw six cases of continued fever "complicated with stupor." Young persons and children suffered chiefly. The native doctors, in charge of eight different

dispensaries, suffered from fever in the first fortnight in April. The worst places were Oargram, Ausgram, Aroar, Chota Boynal; Kunchunnuggur and other suburbs of the town; Bamneah and Gobindpore, Bally, Gourhatty and Aklokey. In the last fortnight in April the fever abated; cases of continued and remittent fever became rare, and the number of acute seizures gradually decreased. In the first fortnight in May, sickness had decreased everywhere. In the second fortnight in May, there was a very slight general increase in the number of fever cases, but it again declined. In the first fortnight in June, the general health of the population was on the whole good for Burdwan. The fever was said to be "slowly but steadily abating." "Old cases are fast improving, and the district enjoys good health." This general improvement gradually went on up to 15th of July, when again there was an increase of fever. "Many people who had remained well for months got attacks of ague." In the first fortnight in August, fever had increased all over the district. Relapses of ague cases and new cases of ague were met with in nearly every place, but unlike those of past years they "were easily amenable to treatment, and were attended with very small mortality." From 21st August matters began to look more threatening. Fever increased, and cases of continued and remittent fever came more frequently under notice. This increase was not noticed in the northern or eastern portion of the district. The number of sick in the suburbs and town of Burdwan was very great, and the Police Hospital was overcrowded. In the early part of September, fever was at a stand still, that is neither an increase nor decrease was noticed; but in the second fortnight of that month, there was an undoubted and general increase. The most unhealthy parts of the district were the west and south-west. Fever again broke out violently in the villages of Pamrah, Gangpoor, Naudoor, Amrah, and Bykantopore. It also broke out in

the villages of Mainapore, Heejulti, Lagoora, Panooah, Baitah, Kushba, and Deshra, in Thannah Kotulpore and bordering on the Bancoorah district. In the former five villages the fever had raged in previous years, but the latter seven were attacked for the first time, although a slight increase in the number of fever cases was observed at the close of the rains in 1872. I inspected these villages and this tract of country, and saw about 300 persons suffering from intermittent and remittent fever. The majority of the cases were of a mild character, chiefly affecting children; but there were some very bad cases of remittent fever. The people informed me that last year they had a few cases of fever amongst them, but never before such a number as at present. The inhabitants think that they got it from Jehanabad, and are so afraid now of that place, that no matter what crime is committed in the village, no man will venture to the Deputy Magistrate's Court in Jehanabad. The soil of the place is laterite, hard, and dry. The drainage is good; there is not much jungle in the villages; the houses are dry and well raised; ventilation is fair; the people are well off; and drinking water is obtained from wells. The population is composed of successful weavers, workers in brass and copper, and agriculturists. Fever was also prevailing on the other side of the tree jungle in the Bancoorah district as far as Bissenpore. I expect that these places will suffer severely next year. Near Kotulpur I inspected the large village of Bamoonayri, in which fever has not as yet appeared. The inhabitants are well off, healthy looking, and are generally weavers by trade. There is no perceptible difference between this village and Mainapore. On my return to the station, I found most of the residents down with intermittent fever. In September there was an increase of fever in the north-west of the district, while the old unhealthy Thannah of Selimabad showed signs of great improvement. In it the village of Panchra only was unhealthy. In the first

week in October, there was a very fatal type of remittent fever at Hajeepore, where there was a mild form of the disease in 1872. It did not last long, and by the 20th of the month, only ordinary cases of ague and mild remittent fevers were to be met with. At Tajpur, Thannah Kotulpur, a good many cases of enteric fever were seen. Although isolated cases of this disease are now and again met with, yet the number sick at Tajpur was something unusual. It was ascribed to the manure heaps which each householder keeps in front of his door for sugarcane cultivation purposes. In Buddungunge, Thannah Goghat, to the south-west of the district, fever also broke out violently in October. In 1872 there was a mild form of fever in this place, but this year it was more virulent and fatal. In October, I inspected the whole of the western portion of the district, in consequence of reports which had reached me. In Kalikapore on the Adjye, in the north-west, fever broke out in October, also in Gossainkhund, and other adjacent villages. Kalikapore has been attacked for the first time this year. It reappeared in Patrosyer and Sonamukhi, Gopalpur and Paraj, Thannah Bood-bood, and in the adjoining villages; in Indas, Kurshindi and other places adjacent. In the latter week of October, it appeared for the first time in Mancoor station on the line of railway. At Seraitikur to the south-west of Burdwan it again broke out. Fever now exists in the town and suburbs of Burdwan, in the centre, south, west, and north-west of the district; slightly in the north (the worst places being Chanoke and Mungulcote), and south-east as at Jamalpore and Jowgram, and not at all in the north-east, where it first broke out in the district of Burdwan. Since October there has been no fresh outbreak, and no new village has been attacked; but, on the contrary, there are signs of an abatement, which will, in all probability, go on until the rainy season of 1874, when it will appear in many of the old places, and, I am afraid, will be

severe in the western tract. This tract is bounded on the east by a line drawn from Paltia in the north to Myapoor in the south. I cannot say how far the fever has this year extended in the adjoining districts, but I hear that it has gone on to within 12 miles of the station of Midnapore.

Mortality.—From the foregoing history, it is apparent that the fever, as a rule, when it regularly broke out, was very fatal. It has been generally estimated at about one-third of the total population. In 1869 the total population of the town and suburbs of Burdwan was estimated at 46,121. In 1872 the census gave a population of 32,687, which shows a decrease in these years of 13,000, or taking births into consideration, of about 15,000 persons. In Nollah it is said half of the population died; at Sonamukhi one-third died; and other places were said to have been "nearly depopulated."

Symptoms and types.—Three types of the fever are met with, *viz.*, the ordinary ague, which may be quotidian, tertian or quartan; the mild remittent fever; and the malignant remittent. Often these are seen in one individual—intermittent fever for a few days, lapsing into mild remittent, and this into malignant or typhoid remittent. I use the word *typhoid* in its literal *sense*, and in no way as connected with *enteric* fever. These fevers, or rather the three types of fever, with their modifications, constitute the "Burdwan fever," or endemic fever of Lower Bengal. Simple continued fever, and cases of enteric, are, as in other districts, occasionally met with. When the endemic is mild in a village, all the cases are intermittent; when it is more severe, the remittent fever is also seen; and when it is virulent or fatal, the malignant remittent (called also continued fever), and the congestive remittent, are rife. Mild remittent or intermittent fevers require no description, but the malignant remittent needs a short notice. I give a few cases of this form of fever, which I closely watched and observed. It is the really

fatal fever in Burdwan, although, as I shall afterwards show, mild remittent, by becoming congestive, may rapidly prove fatal. The malignant remittent is very like true typhus, and such I thought it was, but repeated observations made me change my opinion. The tongue may be brown, dry, and cracked; there may be sordes on the teeth; dorsal decubitus; dull heavy look; closed eyes; deafness; low muttering or violent delirium; subsultus tendinum; congested eyes, and in a few cases *petechiae*. The temperature is over 100°, down in the morning and up in the evening. The bowels are confined, and the systolic sound of the heart is inaudible. It differs from typhus in the duration of the disease; the absence of typhus eruption; the range between morning and evening temperatures (being more like enteric fever in this respect); the uncertainty of the remissions, although well marked if closely observed with the thermometer; and the non-contagiousness of the disease. Dr. Murchison says, "True remissions are not met with in typhus." Mild remittent may prove fatal, and very often does in the following way. A man gets intermittent fever the first day, but the attack passes off in the evening, and he feels better. Next morning fever again comes on, which abates towards evening, but does not go away, in fact, it becomes remittent. In the night there is an exacerbation, and the man becomes comatose. He will then be found with both pupils dilated, or one dilated and one normal or contracted; laboring and stertorous breathing; quick weak pulse, and perhaps a moist skin, or the body is slightly above normal temperature. In this state he dies. Fever of this type (called congestive remittent by writers) may kill in 36 or 48 hours from first attack. In the malignant or typhoid remittent, death generally takes place from the 10th to 20th day. These types of fever kill in the acute or first seizures; but the majority of deaths occur from the *sequelæ* of fever. There may be frequent attacks of

ague, or of a remittent fever first, and repeated relapses of ague afterwards; gradual enlargement of spleen, and in many cases of liver; anæmia, increasing prostration, wasting, anasarca, dropsy, dysentery, or diarrhœa, and death. The natives call the remittent fever by the names of "*jwor bekar*," which literally means an *unusual* fever, or something out of the common, and "*morok jwor*," which means a fatal fever. The ordinary ague they call "*pala jwor*," which literally means a turning or intermittent fever. In the dispensary returns and reports the bad types of remittent are returned as continued. The thermometer alone would show the difference.

Causes of the Endemic. — The causes have been already discussed, written about, and treated by Deputy Surgeons-General John Sutherland and George Saunders, Col. Haig, R.E., Surgeons-Major John Elliot, D. B. Smith, C. J. Jackson, and many others. They are cyclone of 1864 and famine in 1866; river and railway embankments, Damoodah embankment, over-population, and overcrowding; contagion; poverty of the people and insufficiency of food; bad construction of their dwellings, total absence of all conservancy, want of proper clothing, corruption of water supply, and general filth (predisposing causes given by Deputy Surgeon-General G. Saunders); "excessive wetness of the soil and rapid evaporation from it, causing great saturation of the atmosphere with damp, together with a daily increasing range in the temperature added to a certain amount of cold" (exciting cause given by Deputy Surgeon-General G. Saunders); silting up of the rivers, impediments to drainage, and water-logged subsoil. (D. B. Smith, M.D.)

Let us see what the history of the fever teaches us. (A). It existed before the cyclone, famine, river and railway embankments, and as Dr. Elliot has well shown it has not since been affected by them. Places far away from these works have been

most unhealthy. (B.) Rich and poor, Europeans and natives, suffered together, and therefore it is not a poverty fever. (C.) It was not confined to any particular tract of country; but high lands and low lands, villages on high banks of rivers, and those situated in swamps, on alluvial and on laterite soils, were alike attacked. (D.) The drinking of well or river water did not exempt the villagers. (E.) There is always an abatement, or a total decline from January to June, and an increase or occurrence of outbreaks from July to December. The maximum is in September or October, the minimum in May or June. (F.) In those months (hot months) when the general health is satisfactory, the occurrence of heavy rain, and subsequent heat is always followed by an increase of fever. (G.) The endemic is as a rule mild in the first or second year, virulent and fatal in the second or third year of its existence in a village. (H.) It lasts for certain number of years in a village, may rise or fall in succeeding years, but at last dies out. *Over-population* does not appear to have had much to do with the fever, or in any case it was not sufficient to produce it; besides it is not the type of disease which overcrowding would produce. The last census gives for Burdwan district a population of 610 persons per square mile. Census of 1814 gave a population of 600 to the square mile. Allowing for mortality previous to 1872, there could never have been more than 750 to the square mile. This figure is far below what it is in other places. North-east of the Adjye river has never as yet been afflicted with the fever, and yet the population there is as great, and the people live under the same conditions as in other places in the district of Burdwan. Many other instances might be cited.

Poverty of the People.—This I thought, during my first few months' residence in Burdwan, had much to say to the outbreak of the fever; but since then I have travelled over the whole

district, north, south, east, and west, and have kept my eyes and ears open. I do not believe that the people were worse off in any way when the endemic fever came amongst them, than they were in the years which preceded it. In many fever-stricken villages I saw no poverty, not even a pauper. Fever in many households produced poverty, but poverty did not produce fever. It is not famine or poverty fever. An inquiry is now going on through the district into this very question, and I am certain the result will bear out my affirmation. It is true that the poorer classes have died in greater portion than the wealthy or well-to-do, and that the most populous villages have suffered most, but this is exactly what we should expect, and in fact it could not be otherwise for obvious reasons. It is true also that the prices of the necessaries of life have risen considerably in the past 12 or 15 years, but so have wages and cost of manufactures. The only classes who have really suffered from poverty are weavers and other petty manufacturers, whose wares have been driven out of the market, or reduced in value by the introduction of foreign goods, or by machinery, but then the fever did not originate amongst them. I may give one instance. Mungulcote village suffered very severely, and is now suffering. The inhabitants are nearly all Mahomedans, and use beef largely, in fact, so largely that they ascribed the fever to the heat-producing nitrogenous diet. It was said that the chamars and sweepers, who use meat and spirits, were exempt, or nearly so from fever. Investigation shows the reverse. The history of the fever in the town of Burdwan proves the contrary. The municipality were "without scavengers or sweepers," says Mr. Metcalfe. There is no doubt that the predisposing causes detailed by Deputy Surgeon-General G. Saunders predispose to any disease, or as Dr. Elliot truly remarks in his exhaustive report for 1871, people "so circumstanced invite disease," but my opinion of the exciting cause

is opposed to that of Dr. Saunders. "With a saturated atmosphere there must necessarily be a low range of temperature, and this saturated atmosphere and low thermometric range co-exist in the very months when we have outbreaks of fever, and relapses of the old cases. In the non-fever months we have a dry atmosphere and a high range of temperature. But, supposing that Dr. Saunders' theory of the exciting cause is correct, why is it that the fever has been and is confined to certain tracts in Bengal, while the atmospheric conditions exist in many other non-feverish places. Where in Bengal Proper can the atmosphere be so humid as in the eastern districts, such as Mymensing, Dacca, Burrisal, and many other places. Dr. Saunders says that in September when the sky clears after the monsoon months, "the land has more or less been drained of the surplusage of water in these rice plains of Bengal, then very rapid evaporation goes on from the surface, the atmosphere becomes surcharged with moisture, and with the advanced season of the year, the daily range in the thermometer advances to 18°, 20°, and 25°. It is the coincidence of these conditions which excites to a febrile state." This year in the first half of September, the average daily humidity was 92°, and the average daily thermometric range was 9·03. In the second half of the month the average daily humidity was 79·9, and the average daily range was 12·43. In one year the fever broke out as early as April when these conditions could not have existed; and most of the outbreaks occurred in July and August (or during the rains) when as a rule the sky is overcast. I am sorry that space will not allow me to extract Dr. Saunders' interesting and important paragraphs from 38 inclusive. He there records the sufferings in previous years in Kishnaghur, Baraset, Hooghly, &c., and reminds us of the fact that there is very little sickness or mortality to be found there now. He assumes, and I think justly, that the climate in these places

was, with slight modifications, the same in 1870-71, as it apparently was from 1861 to 1865, and says:—"The sun has had the same power in 1871 as in 1861, the land is still undrained; the depurification of the water-supply has still gone on." Then he asks:—"Will the malarial theory account for it?" I think the malarial theory will account for it, and I think these facts recorded by Dr. Saunders, and also the history in Eastern Burdwan, are particularly damaging to his theory. Dr. Saunders accounts for it by the "POVERTY OF THE PEOPLE, and the bad hygienic condition in which they are maintained." Poverty of the people has never as yet been proved, while in other parts of Bengal we find a denser population living under the same conditions as the inhabitants of Kishnaghur, Jessore, Hooghly, and Burdwan, and subject to the same atmospheric changes, without an outbreak of endemic appearing amongst them and sweeping off a third of their number. On this subject, at page 1153 of the Supplement to the *Calcutta Gazette* of 20th August 1873, a minute by His Honor the Lieutenant-Governor of Bengal will be found. I may now briefly discuss the question of *contagion*. No medical man, I believe, who has seen much of intermittent and remittent fevers, can consider them as either infectious or contagious. I never saw an instance of contagion or infection. In an overcrowded hospital no one caught the disease from those typhus-looking cases that I had under my care. No authentic instance of contagion has ever been recorded. The disease most certainly is not personally contagious or infectious. I now come to the last cause, and that one which of all others seems to have at any rate something to say to the causation, development, and progress of the endemic,—*viz.*, the obstruction to drainage, silting up of rivers, and water-logged subsoil. In connection with this subject, I annex a statement showing rainfall and number of rainy days in each month during the years from 1861 to November 1873.

Statement showing the Rainfall and Number of Rainy Days in each Month during the Years, from January 1861 *to November* 1873.

DISTRICT OF BURDWAN.

YEARS.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR YEAR.	
	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.
1861	0·60	1	..	..	0 30	3	1·30	3	12 90	11	16·55	16	31·30	14	8·20	7	13·80	10	13·10	8	2·70	2	0·60	1	101·35	76
1862	0·40	2	..	..	0 07	2	7·70	6	5·40	5	15·00	10	27·80	20	9·90	9	15 90	13	23·40	8	..	..	0·30	1	105·87	76
1863	..	..	0 50	1	..	..	1·65	5	4·45	9	17·5	17	13·90	21	15·3	9	4·90	10	2·00	8	0 25	1	..	..	60·45	81
1864	..	..	1·20	1	0 90	1	1 50	2	5·90	7	7·35	8	15 00	24	9·70	12	4·20	8	8·30	5	0·30	1	..	..	54·35	69
1865	..	..	2 60	3	1·90	2	1 90	3	16·30	16	5·20	8	13 50	19	4·00	13	6·60	11	..	..	..	..	0·10	1	52·10	76
1866	2·30	3	..	..	0·40	1	2·35	5	1·40	3	16 50	15	10·70	13	13 30	22	5·60	13	3·40	4	..	..	..	..	55·95	79
1867	0 30	2	0 30	2	1·10	5	1·80	4	2·50	4	5·80	13	13·90	20	12·40	10	6·40	13	4·80	8	2·50	1	..	..	54·80	82
1868	..	..	0·70	3	0·90	2	4·70	5	6·50	4	12·90	14	8·60	10	34·60	19	14·50	18	0·10	1	..	..	..	..	83·50	76
1869	0 20	1	0·30	1	1 80	2	1·60	4	1·70	6	12·50	7	5·30	16	4·80	8	3·40	7	6·90	6	..	..	..	..	38·50	58
1870	0·20	1	..	..	..	..	3 90	6	0·60	2	4·70	10	9·60	17	15·80	23	8·50	14	3·00	6	..	..	..	..	46·30	79
1871	..	..	0·20	1	2·20	3	4·00	9	5·90	11	13·90	16	14·30	20	16·38	25	11·95	19	5·48	5	..	..	..	..	74·31	109
1872	..	..	0 60	3	..	..	3·10	5	2·51	5	7·27	15	6·66	19	8·33	21	5·52	13	9·44	6	..	..	0·12	2	43·55	89
1873	..	..	..	..	2·00	4	4·17	6	3·44	5	6·44	10	19·50	25	17·15	17	4·44	10	0·20	1	..	..	..	..	57·34	78

The greatest rainfall was in 1862, and the lowest was in 1869, both bad fever years. In fact, taking year by year the rainfall does not appear to have any influence in the causation or prevention of the endemic. The subsoil water register, which has been kept in the jail, is very imperfect; but from it I gather that the depth from surface-level at which water is found in May is 13 feet, and in September at 3 feet. These figures represent the extremes in a year. Men who have carefully studied the subject, who have seen much of the fever, and who have inspected villages and localities, agree that the fever is a *malarious* one, and that the last given cause is the potent factor in producing the malaria. I may mention here Surgeons-Major John Elliot, D. B. Smith, A. Payne, C. J. Jackson, and others. Evidence goes to show that it is purely an endemic fever in Lower Bengal, and that it is caused by some poison arising from, or generated in, the soil under certain conditions of the atmosphere, the chief of which is moisture. There appears to be some imperceptible but gradual change taking place in the formation, topography, or physical condition of the Gangetic delta. This change has been going on for years, occurred first in the tracts on the eastern banks of the Hooghly and Bhagiruthee rivers, and has gradually extended from east to west, affecting some places much more than others. Evidence points to such a change as having taken place, and as still occurring, be it a rising or falling of the level of the country, and a consequent alteration in the courses and depth of the rivers, khals, nullahs, and bheels. "Vast bheels are now high meadow lands, deep watercourses have been obliterated, and these changes are still going on." The maximum intensity of the fever has been felt in the vicinity, along the banks, or close to the intersected *khals* of rivers, such as the Gobaduk in Jessore, Choomee in Nuddea, the Hooghly, Bhagiruthee, Damoodah, Banka, and Dalkisser in Burdwan, the north-west of the Adjye on the south of

Beerbhoom district, and between the Silye and Cossye rivers in Midnapore. This change, or the poison which it produces, is not confined exclusively to alluvial tracts or low-lying lands, but extends also to the laterite soils and higher lands. A certain gradual but distinct general rise in the level of the country seems to prevent the spread of the fever. In his report No. 422 of 14th August 1872, the Commissioner of Burdwan writes:—"I find that one tract to the west of the district is entirely free from all fever. From Kalkapore on the Adjye to the north, through the Police station of Kaksa, down to the southern limit of Pergunnah Sonamookhee, a line separates the healthy and unhealthy tracts. As far as I can ascertain at present, this is coincident with a gradual rise in level of the soil from this line westwards up to the level of Raneegunge." That people living on laterite or rocky soils should become affected with this type of fever is nothing new. Old medical literature gives numerous instances of people in sandy plains and on rocky tracts, as well as in low-lying marshes or swamps, contracting intermittent and remittent fevers. The Burdwan fever is identical with the Mauritius, Burmah, Assam, and other malarious fevers. What has puzzled people is the apparent travelling of the disease, or its steady progress from east to west. Now I do not think the fever *per se* has travelled, but the cause, or that peculiar change which has taken and is taking place in the level of the Gangetic delta, has travelled, and caused disease along its wave-like course. What that change is I consider a chief point for determination. Has the level of the country fallen or risen? This question can best be determined by the engineer and the geologist; and with it is associated the question of the alteration in the courses and depths of the rivers and tributaries. Cannot this change, whatever it be, go on to a certain point without being apparent, or without producing disease; but when it reaches that point, or

goes beyond it, the fever poison is evolved and sickness follows? Will not such a supposition account for the outbreaks, and for the mildness of the outbreak in the first or second year? After a certain number of years, telluric disturbances become equalized, and such a harmony between them and human life is established that no bad effects are apparent and disease disappears. One man gets climatized, another gets accustomed to malarious or unhealthy tracts, and why should not the population of an unhealthy village, or formerly infected locality, follow the same rule? Such a supposition would account for the present healthy state of the former fever-stricken villages in Jessore, Kishnaghur, Hooghly, and now in Eastern Burdwan.

If these suppositions do not account for it, there is nothing else at present known that will.

Treatment.—Concerning the treatment of ordinary ague, I have really nothing to say. Such cases are mild, and after getting the secretions into order, quinine in 5-grain doses given during the intermissions will speedily effect a cure. If the exacerbations be severe, diaphoretics are absolutely necessary. In chronic ague arsenic answers best. It may be given in solution, or better still in the form of pill (arsenious acid, grains xl, quinæ sulph, and ferri sulph. pulv., of each one ounce and half, black pepper one ounce, powdered liquorice-root and mucilage q. s. mix, and divide into 800 pills). Each pill contains $\frac{1}{13}$th of a grain of arsenious acid. Two pills may be given daily. This is a most useful dispensary pill for the chronic agues met with in Bengal. In the remittent fevers I must here repeat Dr. Elliot's caution about the administration of quinine. It must not be administered until the secretions have been first carefully attended to, and then only in the remissions. Sometimes in the early stages of remittent fever violent purging and vomiting come on, followed by great prostration. All the cases with this complication that I have seen did well, but they were carefully

attended to, and the result would be very likely different in mofussil villages. The best remedy to check the vomiting is the compound tincture of chloroform, and for the diarrhœa or purging, gallic acid. In the congestive form of remittent, the same preliminary treatment of purgatives and diaphoretics must be employed, the head shaved, cold or blisters, according to stage, applied, and calomel, in combination with small doses of compound antimonial powder, administered. In one of these cases, which I treated for a few days with these drugs in 2-grain doses every two hours, there was complete *aphasia* for three weeks, and then the man recovered. When head symptoms pass off, and a distinct or clear remission comes on, quinine may be administered, but very cautiously at the commencement. I have combined it with antimonial powder at first, or for a few doses, in some of these cases. In the malignant remittent, unless a distinct remission shows itself, quinine ought not to be administered. The best mode of treatment is diaphoretics for the first few days, and stimulants afterwards. I combine carbonate of ammonia (grs. v), spirits of ether (m. xxv), and decoction of cinchona (℥i), and give it every three hours, with a liberal allowance of rum or brandy. After the sixth or seventh day the bowels require no attention. In many cases at this stage a purgative would put an end to life. In some of my successful cases the bowels were confined for five and six days. When there is a distinct remission I administer quinine in 5-grain doses. I feed up all my cases with good soups, &c., &c. Other complications, as pneumonia, bronchitis, and hepatic affections, must be met, as they occur, with appropriate treatment. In villages we find the old chronic cases with enlarged spleen, anæmia, debility, dropsy, and anasarca, of all kinds and gradations, from the commencing fever to the *moribund* stage. For them no persistent course of treatment will answer, but one frequently changed and varied. At one

time the tincture of perchloride of iron with quinine, at another mineral acids and bitters, and at another stimulants. No combinations agree so well as the carbonate of ammonia with chiretta, or tinctura ferri, perchloride, hydrochlorate of ammonia, and calumba. Many cases, do what we can, go on from bad to worse. When there is regular dropsy and anasarca, nothing answers so well as pure milk diet with no medicine; but this cannot be enforced in villages or outlying dispensaries. In 1868 I treated successfully with pure milk diet, cases of these affections in the Rajshahye jail hospital, and at different times since then. Good and suitable diet is as necessary as medicine in the treatment of these chronic cases throughout the fever-stricken villages. In spleen cases counter-irritation over the spleen is very often resorted to. The usual remedy is biniodide of mercury, but as I have seen some anæmic individuals affected by the mineral, I do not like it. Counter-irritation in such cases can be safely produced by diluted cashew-nut oil. When applied undiluted, it often leaves a nasty sore, which in debilitated individuals will not heal quickly. Slightly diluted, it answers very well as a counter-irritant.

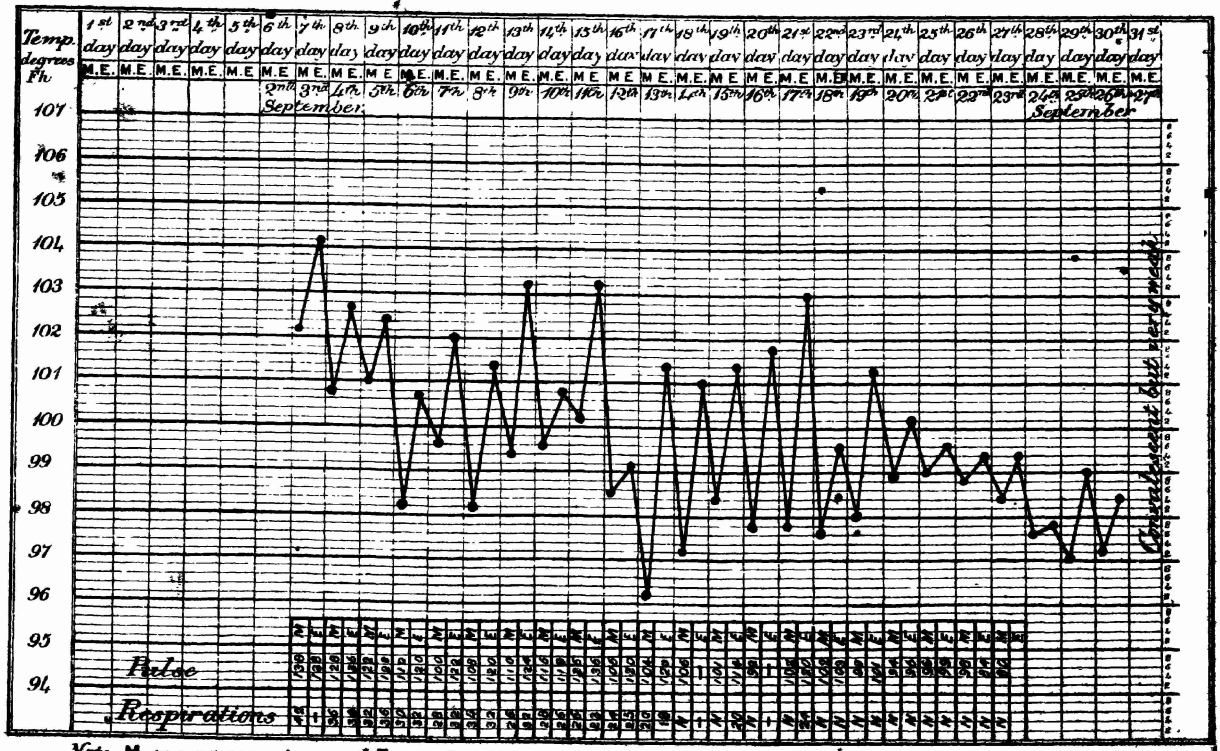
Cases.—The following cases will afford some more information on the types and nature of bad fever in Burdwan. I have often been called to see cases of fever in the bazar and elsewhere, and when sent for have generally been told that the man "has had fever for some days, and now is perfectly insensible." On going into the room I have seen the patient lying in bed, comatose or insensible, moaning, groaning, and tossing about, or struggling violently with friends trying to keep him in bed. Some cases of this kind I saw in October, November, and December 1872, but after this month they apparently died out. The first bad case of fever seen by me (although looking out for them) in 1873, was on 16th of August. On the 15th of that

month, Moharaj Singh was admitted into the charitable dispensary. He was described as a lunatic suffering from fever. My friend, Surgeon-Major Verchere, has already recorded the case in the *Indian Medical Gazette*, but as it was the only *post-mortem* I could get, I may here reproduce it:—"A native of Bareilly, Rohilkund, a Hindoostani laborer, male, admitted on 15th August, on the 10th day of continued fever." The day of fever is altogether untrustworthy, as the man could give no rational account of himself. "Countenance dull and vague; speaks incoherently; considerable deafness; eyes congested; tongue brown and dry; abdomen flaccid; bowels costive; no pain on pressure; urine scanty and high-colored. He continued to go on from bad to worse until the evening of 19th, when he died on the 14th or 15th day of fever. There was no regular eruption on the body, but a few red ecchymosed patches were visible on the thighs and abdomen. In the morning there was generally a fall of temperature, and an amelioration of the symptoms, but these gave way at evening to an exacerbation of fever. Age was about 40, and he was apparently a fine, strong, well-built man.

Post-mortem 8 *hours after death.*—*Brain*—Membranes and sinuses very much congested; excess of arachnoidal fluid; blood everywhere very fluid and dark-colored. *Chest*—Lungs purplish and congested; about ½ oz. of fluid in pericardium; heart empty on left side, and containing dark blood in right side; walls thin and flabby. *Abdomen*—Liver congested but firm. *Spleen*—of natural size, not very soft or congested, but dark-colored. *Kidneys*—normal. *Intestines* were perfectly normal, and no ulceration was found on any part of the tract. *Bladder* contained a small amount of urine. Skin of thighs and abdomen was mottled with reddish and purplish-colored patches." There was no thermometer at this time in the station.

Case II.—Head Constable Obtar Ram, Burdwan Police, was

TEMPERATURE CHART OF CASE II.



Vide M means morning and E evening Temperature.

admitted into the hospital on 2nd September 1873. On admission he was incoherent in his speech, and said he had been ill for 15 days. I ascertained since his recovery that he had been ill for about 5 days with continued fever. Daily range of temperature, number of beats of pulse and respirations, will be found in the chart. In the following history of the case I shall leave these out. On admission the countenance was dull and listless; speech incoherent; tongue creamy, brown, and dry in centre; eyes slightly injected, not yellowish, and pupils slightly contracted; considerable deafness; bowels open; no tenderness in abdomen; urine scanty and high-colored; no spots to be seen; well-marked *subsultus tendinum;* no internal complications can be made out; pulse quick and weak. *3rd September*—Same state. In the evening he was evidently worse. *4th September*—Better this morning; some windy gurgling in right iliac region; voice feeble; one dark-colored stool at night; urine scanty, high-colored, ammoniacal; eyes less red; tongue brown and dry in centre, red at tip and edges, with enlarged papillæ; countenance brighter; face pinched; respiration laboring. *5th September*—Tongue drier and darker in centre; eyes natural, with slight contraction of pupils; urine red, scanty, and micturition frequent; some 4 or 5 dark spots on side of abdomen and back; dorsal decubitus; great general listlessness and weakness; voice improved; face slightly flushed; *subsultus tendinum* worse than yesterday; the pulse is double, and systolic sound of the heart is inaudible; pulse soft, feeble, and very compressible; bowels not moved. *6th September*—At 3 o'clock P.M. yesterday had a dark-colored natural motion; heavier and more listless this morning; somnolent; eyes half closed; pupils natural; tongue drier and getting black in centre; *subsultus* more marked; does not speak unless loudly spoken to; not deaf; voice natural; no tympanitis or gurgling; purple

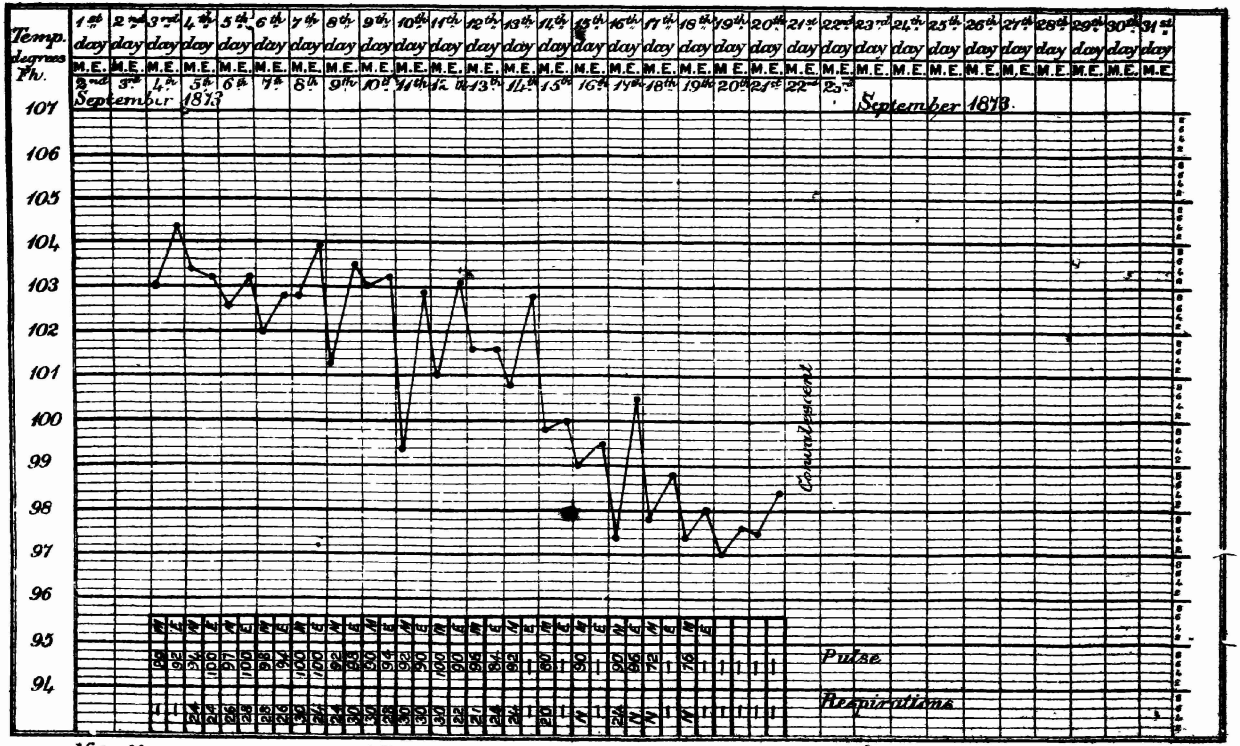
spots on both sides of abdomen; lies low in bed; flies troublesome; the general typhoid state or condition is well marked; faint sweetish smell about the patient; dosed during the day; one stool in bed; occasionally there is a low muttering groan. In the evening the *subsultus* has increased; eyes are injected; tongue moister; very quiet and lies deep in bed. *7th September*—Last evening at 9 o'clock P.M., the native doctor reports that the temperature fell to 97°. The patient remained all night in somnolent state; passed urine three times; no stool. This morning his tongue is dry and black in centre; moist and brown at tip and edges; subsultus as before; typhoid state more marked; sordes on teeth; dark spots as before; pulse and heart as before; breathing shallow; about 6 oz. of urine passed at 9-30 A.M., clear and no sediment, strong acid reaction. A 2-grain solution of nitrate of silver shows presence of a large amount of chlorides. *8th September*—Slept a little last night; much better this morning; he is sweating a good deal; tongue moist and not so dark; he is brighter and not so listless; lies at times on his side. In the evening tongue drier again, but body moist; pulse has some more power; no motion since morning; eyes still congested; pupils normal; getting thin and face much pinched. *9th September*—Improving, better color in face, but tongue keeps dark, and is again dry; the typhoid state is less deep; spots fading; pulse fuller; one natural stool; urine as before; slept off and on during the night; eyes natural; *subsultus* as before. *Evening*—High fever again since mid-day; more restless; no headache; tongue dry, and dark in centre and apex; sinking deeper in bed; no motion; passed urine four or five times during the day; appears in an almost hopeless condition. (Most of the above notes were taken by Surgeon-Major Verchere, who was watching the case with me). *10th September*—Better again this morning; pulse still weak and feeble; tongue very tremulous and dry; sordes blacker;

no motion. In the evening he was much better than last evening; tongue shows a disposition to clean, and is moist at edges; *subsultus* less marked; countenance brighter. 11*th September*—Tongue cleaner to-day, and not so dry as before, but still very tremulous; no motion since 9th; no *subsultus* to-day; eyes normal; sordes disappearing; slept last night. 12*th September*—Had an exacerbation of fever again last evening, but slept well during the night; tongue is drier than it was yesterday; urine normal; appetite improved; pulse still weak, but has more power and force; both sounds of heart are audible—first sound very weak, second sound sharp and clear; one natural motion at 11 o'clock A.M. Improvement continued in the evening with a rise of 5° only in temperature. 13*th September*—Marked improvement this morning; pulse still high, but body has gone below natural temperature; tongue clean; lies on his side; spots gone; slept well last night, and appetite is fair; still his countenance is very much sunken. *Evening*—There is again an exacerbation of fever, but not so severe as it was on 11th. Notwithstanding the fever he continues to improve. The breathing is unaffected. 14*th September*—Had a natural stool this morning; urine normal, but increased in quantity; sleep was disturbed last night; tongue clean; spots slightly visible again to-day; appetite good. In the evening there was again an exacerbation, which disappeared in the night. 15*th September*—Temperature natural this morning; no motion since yesterday morning; countenance brighter; urine normal; slept well; pulse stronger; progressing well. On the 16th, 17th, and 18th, there were regular intermissions in the mornings, and exacerbations in the evenings. That of 17th was again very high (103°). In other respects he continued to do well. The evening exacerbations in the next two days (19th and 20th) were not so severe, and the morning temperature was nearer to the normal standard. From the 21st he continued to do well,

and on 27th was pronounced convalescent, but his recovery to health and strength was very slow. He has since had no relapse, and is now well. *Remarks*—From the above history, and the look of the man as he lay in bed, this case in its early stages was exactly like a typhus one, I diagnosed it so then; but from the subsequent progress, the daily thermometric range, the uncertainty of the remissions, the prolongation of the illness, and the intermissions before convalescence, together with the fact that in the hospital (which was then overcrowded) no man, not even his attendants, got a similar attack, I think that now any medical man will diagnose it as a case of *typhoid*, adynamic or malignant remittent. Some might consider it a case of enteric fever, but I think the character of the stools, and absence of all tenderness on deep pressure on the abdomen (he was daily examined for this), with the general history of the case, will prevent its being put under this head. Other cases also, which have since occurred, present the same type.

Case III.—Uli Mahomed, a constable, admitted into Police hospital on 29th August with intermittent fever; age about 37 years; bad constitution and enlarged spleen, suffered from chilliness, dulness, and slight intermittent fever attacks for first four days. On 2nd September fever became remittent or, as he said, continued. The first observation made in his case was on 4th September. The temperature on that morning was found to be 103°; pulse 89, soft and compressible; tongue slightly furred; states that the fever has not left him since the 2nd September. On 3rd he had two natural stools; the abdomen is not tender on pressure, but the spleen is enlarged; had no sleep last night; is restless, and complains of bad headache and pains in the back. On the 5th September the pupils were slightly contracted; face natural; some gurgling in right side of abdomen; urine high-colored and scanty; tongue creamy, with prominent red papillæ at tip; says he has had no

TEMPERATURE CHART OF CASE III.



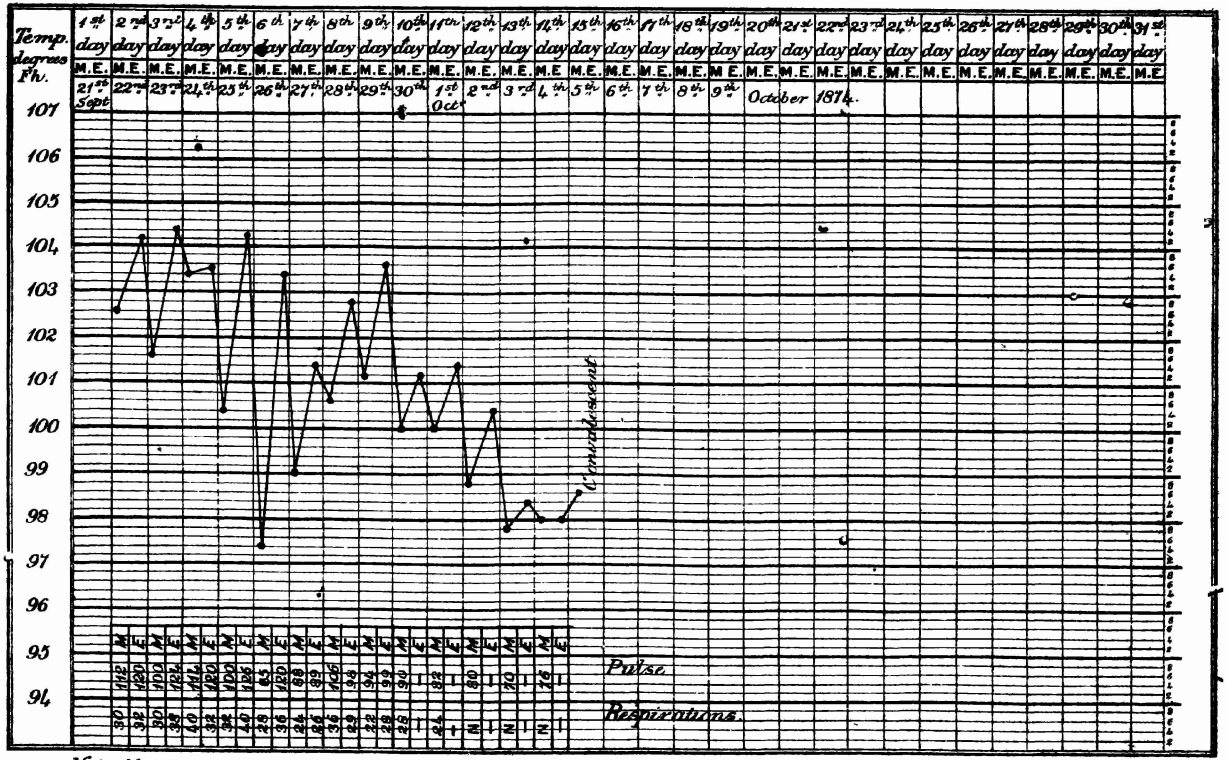
Note. M. means morning and E. evening Temperature.

sleep and no sweating; head feels very heavy; had three stools during the day, color natural, and consistence normal; *decubitus* dorsal; no *subsultus tendinum*. *6th September*—Had a small motion this morning, pultaceous, yellow; urine muddy and dark-colored; eyes and pupils natural; face natural, but slightly more pinched than it was yesterday; speaks in a whispering voice; no headache to-day; no deafness; no *subsultus;* no tympanitis; slight gurgling in right iliac region; tongue is getting browner in centre, and shows inclination to dry; heart's sounds normal; no spots; complains of great thirst. *Evening*—Had a little griping during the day and three loose stools; no sleep; quiet and listless; lies lower in bed; appearance somnolent; urine clearer, but scalding. *7th September*—Pulse soft and compressible; states that he has had no sleep; face is more pinched; eyes and pupils natural; urine clear and strongly acid; nitrate of silver shows a large amount of chlorides; some spots on the arms—nature very doubtful; they are pale, small, and ill-defined, may be mosquitto or bug bites. *8th September*—Pupils contracted this morning; countenance dull and listless; tongue still moist but furred; three doubtful spots visible on abdomen and chest; says he has had no sleep; other symptoms same as before. *9th September*—Same history as yesterday; countenance is more pinched; no motions since yesterday; complains a good deal of thirst; feels very anxious. At evening visit he was found to be much prostrated; body very hot; pulse weak and very compressible; no motions; tongue drying; wandering now and again. *10th September*—Tongue browner and drier, red at tip and edges; eyes closed; breathing more labored; spots faded and gone; no tenderness on pressure over abdomen; heart's impulse imperceptible, and systolic sound only faintly audible; speaks when roused, but prefers to lie on his back in a listless manner; no deafness; no motions; urine as before;

eyes sunken; pupils normal. 11*th September*—Countenance brighter and better looking this morning; had a copious perspiration for about half an hour from 4 o'clock A.M., and slept after that; tongue moist at edges, but still brown and furred in centre; no sordes; had one natural motion this morning; pupils slightly contracted; feels very weak. In the evening there was again an exacerbation of fever; continued well until evening, and sweated slightly about 3 o'clock P.M. 12*th September*—Not so well to-day as yesterday, although he had some sleep last night; had one natural motion this morning; has slight appetite, but complains very much of thirst; other symptoms as before. In the evening as usual; there was an exacerbation; did not sweat during the day. 13*th September*—Had one natural stool this morning; passes urine frequently, which is clear and acid; says he slept well last night; tongue is cleaner and more moist towards edges and tip, but still has dry brown fur in centre; no pain anywhere; pulse is better and has more power; respirations are normal; heart's sounds are more distinct. 14*th September*—Had another natural motion this morning; slept last night; tongue moister, but the countenance is very much sunken; still lies on his back; no gurgling or pain anywhere; says he continued well all yesterday. On the evening of the 14th there was again an exacerbation, but the fever passed off during the night. He continued with slight daily variations to improve (the temperature on the last four mornings going below the normal standard) until the 21st when he was convalescent. He slowly but gradually recovered strength, and since his discharge from hospital has not had a relapse. I have no remarks to make about this case, as the history in my opinion shows what it is, except that the adynamic symptoms were not so well marked as in Case No. II. (See Temperature Chart).

Case IV.—Railway Constable Gunesh, who had been stationed

TEMPERATURE CHART OF CASE IV.



Note. M means morning and E evening Temperature.

at Gooshkara station, was admitted into hospital in Burdwan on 16th September 1873, with intermittent fever; age about 36 years; constitution good; no complication. This man's case did not attract any attention until the 22nd, when he stated that fever came on, on the previous day, and had never left him since. His temperature then was found to be 102°6; pulse 112, weak and compressible; tongue furred, red at tip and edges; eyes congested, and pupils slightly contracted; one natural motion yesterday, and another this morning; urine high-colored and scanty; no headache; slight gurgling and tenderness in ascending colon; respirations slightly labored; lies on his right side. *23rd September*—Same as yesterday; had an exacerbation last evening; no sweating; no sleep. *24th September*—No motion yesterday or this morning; no sleep; is lying on his side; tongue more furred and tremulous; complains of slight frontal headache; no gurgling to-day; pulse soft and weak; dull heavy look; slight deafness. *25th September*—No motions; was delirious last night and yesterday evening, getting up and wandering about. The delirium was worse about 9 or 10 o'clock P.M.; no sleep; urinates in his bed and clothes; deaf, dull, and listless; eyes closed and congested; pupils normal; tongue getting dry; sordes appearing on teeth; countenance sinking; *decubitus* dorsal; no gurgling or pain. *Evening*—Much worse this evening; breathing labored; head and skin very hot; lies on his back with his legs drawn up; eyes very much congested; does not speak or answer questions when spoken to; muttering and groaning; tongue dry, brown, and glazed; has twitchings of muscles of face and fingers; systolic sound of heart inaudible; impulse imperceptible; passes urine under him; flies very troublesome; no internal complications. *26th September*—Temperature has fallen considerably this morning; lies in a don't-care sort of style in any position in which he may be placed; countenance very much sunken; cannot speak; will

not open his mouth, or protrude his tongue; no motions; bowels confined; still urinates in his clothes; abdomen flaccid, and does not appear to be tender on pressure; pulse very weak; native doctor says that he found him cool at 1 o'clock A.M. *Evening*—Was delirious during the day; twitchings of muscles increased; eyes congested; pupils normal, but sluggish; no motion, but there is windy gurgling in ascending colon; tongue moist at tip and edges, but brown, dry, and cracked in centre; passes his urine under him; does not call for anything. 27*th September*—He appears to be better this morning; sweated a little at 9 o'clock P.M. last night; is lying on his side; is more sensible and got up once to urinate; tongue moister, cleaner, but very tremulous; eyes open, not so much congested as before; pupils normal; bowels still confined; heart's sounds and other symptoms as before. 28*th September*—Last night he was furiously delirious, although the exacerbation was not so severe as on previous evening; he required two men to hold him in bed; he had no sleep yesterday or last night; countenance is very much pinched or sunken; urinates in bed; dry sordes on teeth and gums; tongue moist and red at tip, but very tremulous, dry, and brown in centre; no motion; muscles still tremulous and twitching; voice husky and speech incoherent; appears to be in a hopeless state. 29*th September*—Slight delirium again yesterday noon, none last night; teeth covered with dry sordes; still passing his urine under him, and bowels confined; pulse very weak and compressible; no sleep; keeps on muttering and repeating something to himself; tremulousness and twitchings as before; no sweating. 30*th September*—Delirious again last night; slightly better this morning; no motion; abdomen flaccid; no pain or tenderness; still passing urine in bed; dry sordes; eyes half closed; does not speak; all other symptoms as before. 1*st October*—Tongue moister and cleaner to-day; no delirium last night;

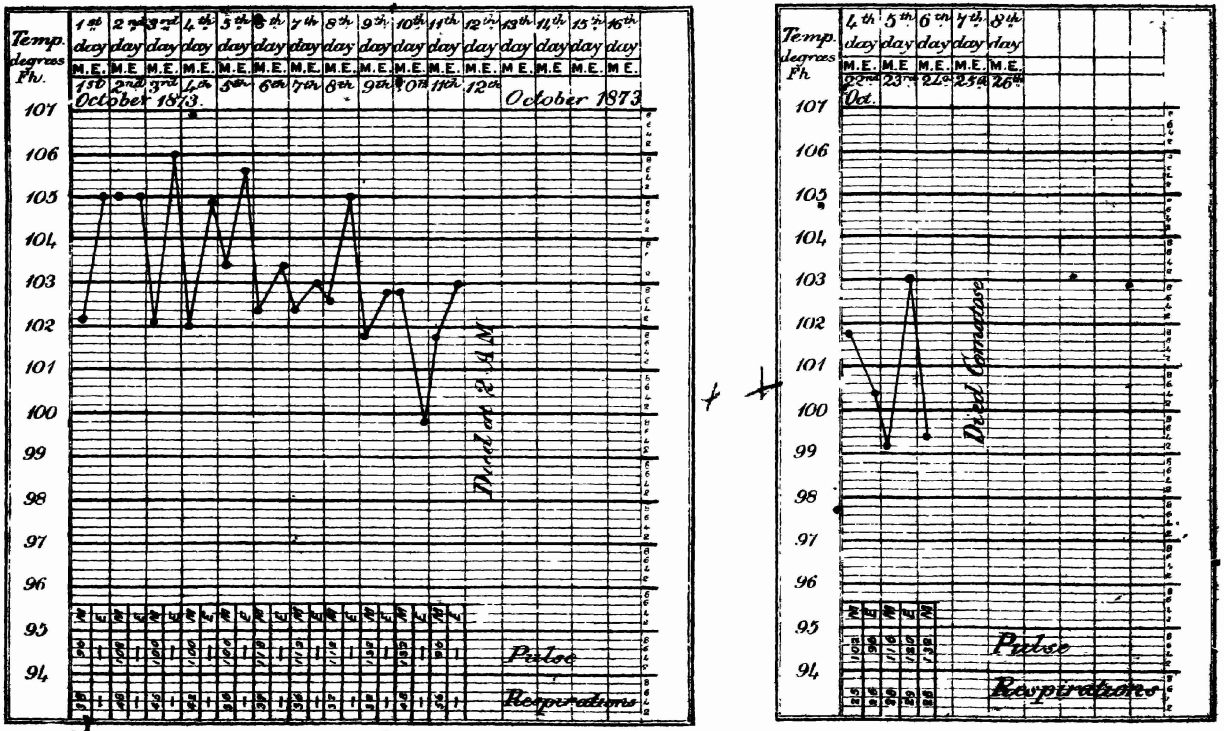
bowels still confined; very weak and listless, but is constantly calling out for water; no sleep; eyes congested and pupils contracted this morning; still lies on his back with his legs drawn up; passes his urine in bed; other symptoms as before. *2nd October*—Slept well last night; eyes clear this morning; pulse better; no motion; tongue more moist and cleaning; countenance is brighter; is able to hear, or rather understands what is said to him; very weak; twitchings and other symptoms as before. *3rd October*—Improvement continues; had only a slight exacerbation last evening, and has an intermission this morning; eyes bright and open; no motion; since yesterday calls for vessel for urine; no pain anywhere; tongue is cleaning; pulse more powerful, and heart's sounds audible; sordes disappearing, and twitchings appear to be passing off; takes his food. *4th October*—Steadily improving; yesterday at noon had a natural motion; slept all through the night. *5th October*—Much improved, and is nearly convalescent; had another natural motion yesterday.

This man slowly recovered his health and strength, and has not had a relapse since he left hospital. During the height of his illness, the case was very like a typhus one, but the history, I think, prevents its being considered such. After an apparent defervescence on the sixth day, there was again a relapse; in fact, it was only a remission. It is beyond doubt that this was not a case of enteric fever, and yet the type is the same in all three last cases, except that in the 2nd and 4th, the adynamic or malignant symptoms were more marked than in the 3rd case, or that of Uli Mahomed. (See Temperature Chart).

Case V.—Constable Inder Ram, age about 31 years, was admitted into hospital on 1st October. He states that he has had fever off and on for the past three days, and that since the previous day it did not leave him. On his

admission the temperature was 102°2; pulse 96, soft and compressible; respirations 38, shallow; countenance anxious; tongue furred but moist; bowels confined; eyes normal, conjunctivæ yellowish; great headache; dry cough; chest everywhere resonant; sibilant *rhonchi* in apex of right lung; heart's sounds normal. *2nd October*—Symptoms same as yesterday; had about ten motions after purgative; tongue slightly furred to-day, and dry cough troublesome; no sweating; urine scanty and high-colored; no sleep. *3rd October*—Tongue still moist, creamy fur in centre, red tip and edges; no sleep; cough very troublesome; severe headache; lies on his back; pulse soft; respirations hurried and shallow; dry *rhonchus* in apex of left lung; no other complications can be made out. *4th October*—Had two motions yesterday and a little sleep last night; headache is better; breathing is better; *râles* and cough still dry; no pain in chest; no deafness; no sweating; no *subsultus*. *5th October*—Breathing better this morning; tongue more furred, but still moist at tip and edges, drier in centre; fever high; no spots; pulse soft and compressible; heart's sounds audible; complains of frontal headache; no sleep; no sweating; dry cough, very troublesome; *râles* distinct in both lungs; clear sound on percussion; no complication in abdomen; eyes normal; countenance anxious. *6th October*—Had very high fever last evening; no sleep; bowels not moved since 3rd; cough and breathing are better; does not hear so well to-day; tongue moister and cleaner than yesterday; complains of slight frontal headache; *decubitus* dorsal; chest symptoms as before. *7th October*—Exacerbation was not so severe last evening, but he is much worse this morning; dull, heavy, and listless; seems to be getting into a delirious state; passes urine under him in bed; bowels unmoved; moist *râles* in both lungs; chest resonant on percussion; heart's impulse imperceptible; pulse weaker; cough moist and troublesome; tongue still moist, with brown fur in centre. *8th October*—

TEMPERATURE CHARTS OF CASES V AND VI.



Note M means morning and E evening Temperature

Worse this evening; respirations gone down; involuntary trembling of muscles; answers questions when loudly spoken to; lies with his eyes closed, and is averse to opening them; conjunctivæ congested; constantly muttering to himself; cough troublesome; expectoration yellowish, mucous. *9th October*—Twitchings and tremulousness of muscles; does not answer when called; respirations same as yesterday; pulse quick and feeble; cough is better; lies on his back; opening his eyes now and again; passes his urine involuntarily; had a high exacerbation of fever last night, and is evidently dying from the typhoid symptoms. *10th October*—Dull, vacant, expression of countenance; eyes open; pupils dilated; twitchings and tremblings much worse; is perfectly unconscious of everything; cannot swallow; passes urine as before; respirations labored; pulse very feeble. *11th October*—Temperature fell considerably last evening, and is now up again; pulse very feeble; countenance sunken; pupils contracted; respirations very shallow and quick; hopeless case; during the day exhaustion and adynamic symptoms, and also temperature of the body increased. He died quietly at 2 o'clock A.M. No *post-mortem* was allowed. (See Temperature Chart.)

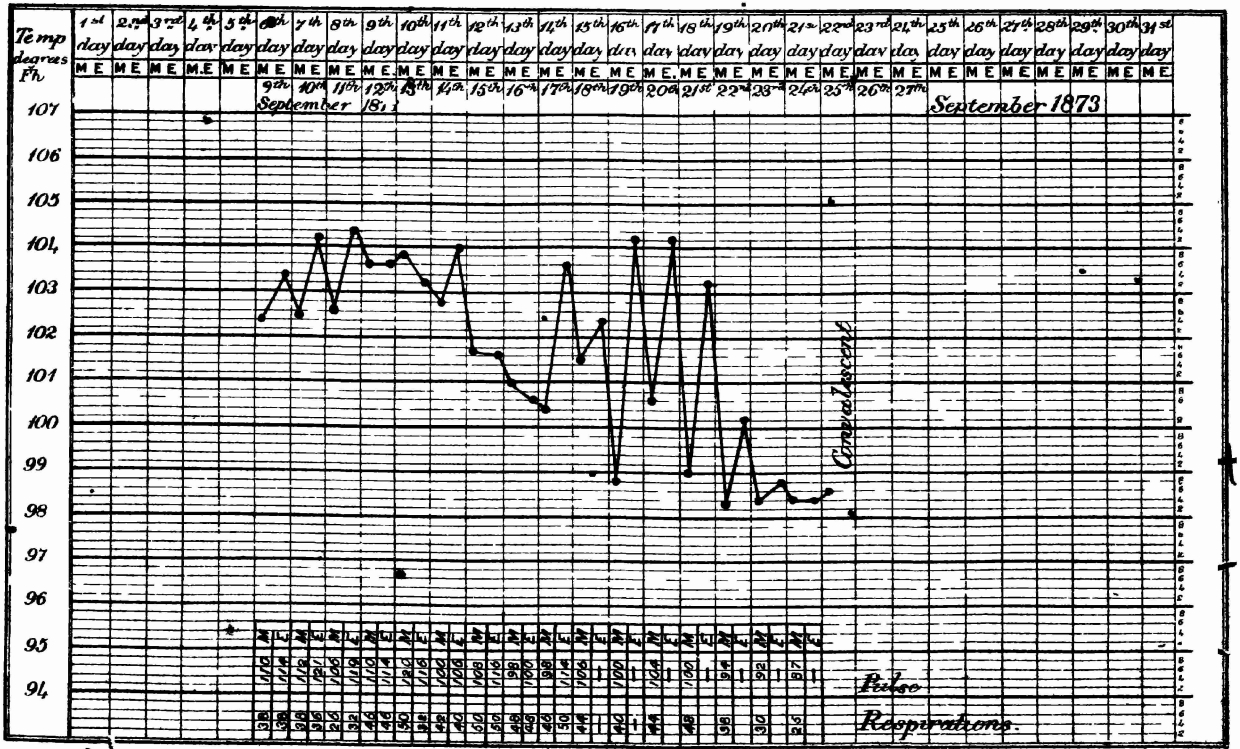
Case VI.—This is a case of congestive remittent fever, after being intermittent for a few days, and terminating on the sixth day in coma and death. Most of the deaths in the villages are from this kind of fever.

Nurod Singh, a constable, aged about 30 years, of good constitution, was admitted into Police hospital, Burdwan, on 22nd October 1873. He stated that he had had ordinary ague on the three previous days. On admission he appeared to be suffering from an exacerbation of intermittent fever, or from mild remittent; temperature was 101°8; pulse 102, and respirations 25; organs all normal, and no complications present. *Evening*—Temperature was 100°2; pulse 96, and respirations 26; bowels open after purgative; no untoward symptom. *23rd October*—

Temperature 99°2 ; pulse 116, and respirations 28. During the day he had a very severe exacerbation at noon, and in the evening the temperature was 103°0, and the man insensible. The pulse was 120, full and strong; eyes congested; pupils contracted. Next morning (24th), the temperature was 99°4 ; the pulse 132, laboring and feeble; respirations 28, shallow ; man perfectly insensible ; eyes congested; right pupil dilated ; left, normal or slightly contracted ; breathing stertorous ; twitching and tremulousness; passing urine under him ; no paralysis; symptoms got worse during the day ; temperature of body fell ; there was no rallying, and he died at 1 o'clock A.M. No *post-mortem* was allowed. (See Temperature Chart.)

Case VII.—Ramzan Ally, railway gate-keeper, came to me on the morning of the 9th September 1873. He said he had had continued fever since the 1st; that it had never left him, and that he had had no perspirations. I attended him throughout his illness in his own house, and took daily observations, which will be found in the chart. On morning of 9th September (the sixth day of fever), the tongue was creamy in centre, edges clean, moist; countenance pale and sunken ; no unusual symptom. In the evening there was an exacerbation ; pulse quick and feeble ; respirations hurried and shallow ; great thirst ; urine scanty and high-colored ; much headache ; very anxious. 10*th September*—Same as yesterday ; one natural stool this morning ; tongue more furred in centre ; eyes normal ; complains very much of headache and pains in back and limbs ; lies on his back moaning. 11*th September*—Had another exacerbation of fever last evening ; no sleep ; slight perspiration in the night ; two stools this morning, yellowish and pultaceous ; sighing and very anxious ; is slightly deaf ; abdomen flaccid ; no tenderness ; micturition frequent ; urine scanty and high-colored ; tongue tremulous ; pulse quick and weak ; conjunctivæ congested. 12*th September*—Remissions not well marked ; body very hot ; great thirst ; tongue

TEMPERATURE CHART OF CASE VII.



Note. M means morning and E evening Temperature.

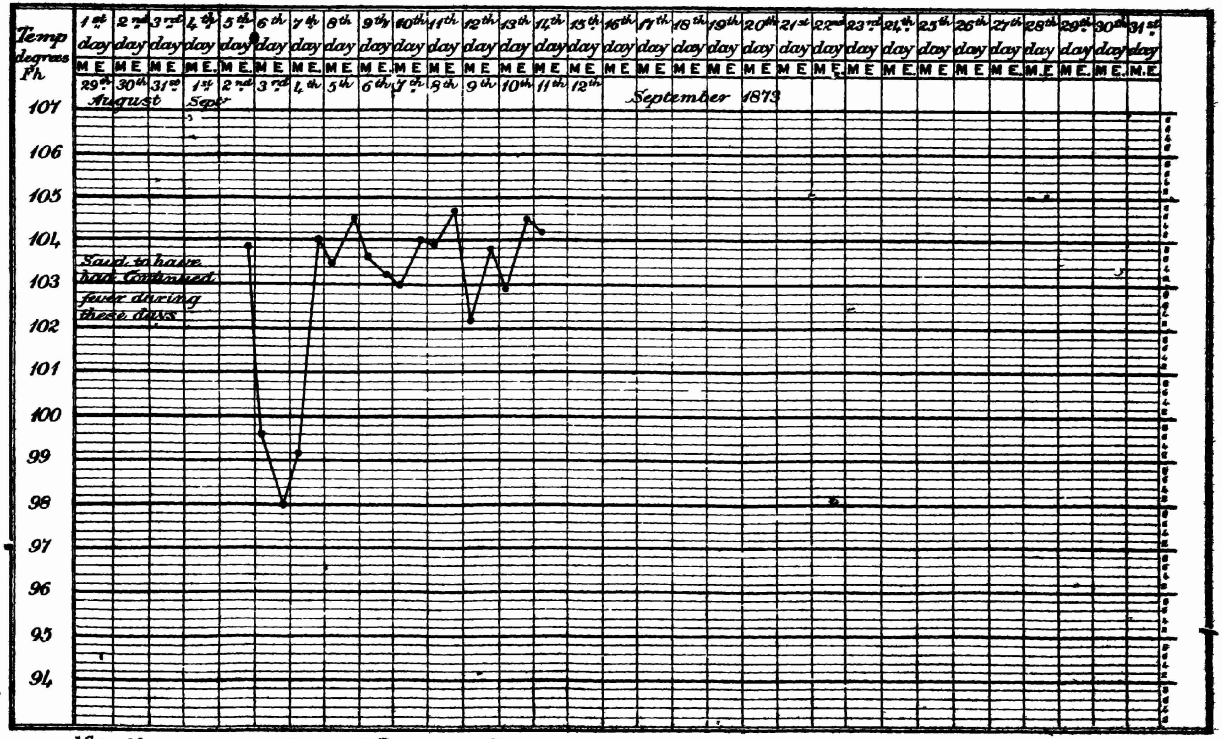
drier; had about ten stools last night; no sleep; no sweating last night; bad headche; vomited once; pulse more compressible; respirations increased in frequency, and very shallow; eyes normal to-day. 13*th September*—Respirations very hurried and shallow; sweated well during the night; says he feels better to-day; bowels not moved since yesterday morning; no headache or pain anywhere; tongue cleaner and moister, red at tip, and edged with enlarged papillæ; lying on his back with his eyes closed; slightly deaf; heart's impulse is very indistinct. 14*th September*—Sweated again yesterday, and slept a little during the day; says he had very high fever after 7 o'clock P.M.; did not sweat any during the night; had no sleep; no motions from bowels; has slight dry cough; no *râles* to be heard; percussion sound clear; other symptoms as before. 15*th September*—Had a severe exacerbation last evening, and about 3 o'clock A.M. had copious perspiration; sleep very much disturbed; slight wandering; head very heavy: countenance dull; breathing very fast and labored; no abnormal sounds, except slight mucous *râles* in right lung at apex; bowels not moved; urine scanty; tongue more coated and drier; cough increased, and there is a little mucous expectoration; voice very husky; pulse feeble. 16*th September*—Sweated again yesterday, and had no exacerbation of fever last evening; bowels not moved; micturition frequent; dull, heavy, and listless, but general symptoms to-day are more favorable; says he has had hardly any sleep; cough is troublesome with mucous, yellowish sputa; countenance very much sunken; dorsal decubitus. 17*th September*—Same as yesterday; remissions are not well marked. 18*th September*—Had high fever last evening, and sweated at 10 o'clock P.M.; tongue brown and dry; countenance very anxious; eyes congested; pupils contracted slightly; pulse weak and feeble; respirations still hurried and shallow; sweated a little during the night; no new symptoms. 19*th September*—Better to-day;

temperature nearly natural; tongue moister and cleaner; had high fever again yesterday evening; no sweating; bowels not opened; respirations decreasing in number; cough is less troublesome. 20*th September*—Not so well to-day, and has slightly gone back; had high fever again last evening; tongue cleaner. 22*nd September*—High fever every evening, with remissions in the mornings; to-day there is a regular intermission; countenance is brighter; tongue is cleaner, and heart has more power; cough better, but still troublesome. He gradually improved, and on 25th was convalescent. He slowly regained his strength, and has had no relapse up to date. (See Temperature Chart.)

Case VIII, or that of Obhoyá, a dhoby's daughter. This I do not detail as it was not regularly followed to its termination. It was one of those cases of remittent fever, complicated during a certain part of its stage, with copious watery purging, vomiting, prostration, and slight collapse. In this woman's case the temperature of the body, on the evening of the 2nd of September, was 103°8, and pulse was 126. During the night violent purging and vomiting came on, and in the morning of 3rd September the temperature was 99°6; pulse 114, quick and feeble. In the evening the temperature fell to 98°. Next morning the temperature was 99°2. She was evidently recovering from the effects of the profuse discharges; and in the evening the thermometer registered 104°; pulse 120, and respirations 64. She then continued to suffer from very severe remittent, almost continued, fever. The accompanying Chart will show the effects of this abdominal complications.

The details of these cases show that remittent fever in Burdwan is sometimes very malignant or complicated, and they also explain the great mortality which has followed the outbreaks in certain villages and localities.

TEMPERATURE CHART OF CASE VIII.



Note M means morning and E evening Temperature

Record of the Relief Measures which were adopted in the District of Burdwan from the commencement of the Outbreak to present date.

In March 1863 a Sub-Assistant Surgeon and compounder were sent to treat the sick in the fever-stricken village of Poorbusthulli. The former having been attacked with fever was obliged to leave the place after having been there for only one fortnight. In 1864 a sum of Rs. 1,000 was placed at the disposal of Mr. Porter, then Assistant Magistrate in Burdwan, for the purpose of jungle-clearing operations in Culna. Mr. Porter reached that place on 21st March 1864, commenced operations, and completed them before the end of May. As the sanctioned sum was small, the work was confined to the clearing away of jungle only in the villages which were suffering from fever. No drainage works were attempted. These operations apparently had a salutary effect, for in 1865 and 1865-66, the health of the inhabitants of the Subdivision was good, but in July 1866, the fever again broke out. In December 1866 a native doctor was sent to Ulore and adjacent villages. In September 1867 two native doctors were sent to the villages adjacent to Mymaree. In December one of them got sick and had to go away. A vaccinator, who had some knowledge of English drugs, was also employed in going about from village to village treating the sick. Baboo Saroda Prosad Roy of Chuckdighee sent his own Sub-Assistant Surgeon to Betiaguriah, and opened a dispensary in that place. Several landholders were addressed with the object of having tanks excavated and cleaned out in villages. Only three or four responded. Baboo Saroda Prosad Roy dug a tank at Betiaguriah, Baboo Radha Binode Chowdhry one at Amadpore, and Baboo Poorno Chunder Roy one at Chotekhund. At the close of September 1868, a Sub-Assistant Surgeon in charge of an itinerant dispensary, and a compounder, were sent to Selimabad and adjoining villages.

This dispensary remained for 16 weeks at Selimabad. On or about 21st January 1869, it was removed to Purbutpore, where it remained three weeks, and on 18th February, it was removed to Debeepore, where it remained for the rest of the year and during part of 1870. The Sub-Assistant Surgeon, who was first sent down, was attacked with fever, remained only for one fortnight, and was relieved by another Sub-Assistant Surgeon. In the rains of 1869, additional relief measures became necessary. To the itinerant dispensary, a native doctor at Rs. 40 per month, a compounder at Rs. 10, and a dresser at Rs. 5, were sent. The sum of Rs. 40 per month was also sanctioned for travelling expenses. To the local dispensary at Chuckdighee the same allowance was given, and an additional native doctor at Rs. 40 was sent. In August four additional dispensaries were opened. One at Selimabad on 16th, and at Bohar, Amadpore, and Jowgram on 17th, with the following establishment for each. A Sub-Assistant Surgeon at Rs. 100, a native doctor at Rs. 40, two compounders, one at Rs. 10, and one at Rs. 5; travelling allowances at Rs. 40, and contingent charges at Rs. 20 per month; total cost equal to Rs. 215, or Rs. 860 per month for the four. The Sub-Assistant Surgeons were ordered to work in their dispensaries, and the native doctors to travel about and visit patients in their homes. The Selimabad dispensary was closed on 11th April, the Bohar dispensary on 1st April, Amadpore on 9th April, and Jowgram on 3rd March 1870.

The following table shows the results, and the number treated in each month:—

Total Number of Patients treated in

Months.	Selimabad.	Bohar.	Amadpore.	Jowgram.
August 1869 ...	3,599	1,072	1,775	214
September „ ...	7,712	1,976	1,747	744
October „ ...	7,767	1,731	2,489	738
November „ ...	7,032	1,368	3,222	838
December „ ...	5,687	1,002	5,569	523
January 1870 ...	2,272	970	3,626	270
February „ ...	1,796	481	2,451	783
March „ ...	731	.....	1,881	.....
April (one week) ...	.....	.....	465	.....
Total ...	36,629	8,603	23,228	4,110
Average per month...	4,069·8	955·8	2,580·8	456·6

Besides showing the work which was done in the dispensaries, this table also shows that sickness steadily increased from September to December, and gradually declined from the latter month. In February 1870, the Magistrate reported that the scheme of having travelling medical officers was a failure, and recommended the withdrawal of the native doctors from the dispensaries, leaving the Sub-Assistant Surgeon in charge. He proposed that the monthly expenditure for each dispensary be reduced to Rs. 122. He said that the "condition of the people in the interior is not such as to require medical officers to visit them in their own homes." In September 1869 a native doctor and compounder were sent to treat the sick in Mungul-

cote and adjoining villages. Early in September 1869 the Municipal Commissioners of the town of Burdwan entertained a native doctor and compounder, and sent them to the suffering villages of Seraitikur and Chota Nilpore, Dhamrai, Shakareepokur, Itchlabazar, and other villages within the municipal boundary. On 28th September, a native doctor for the town of Burdwan arrived from Calcutta. In 2nd week of November two Sub-Assistant Surgeons, two native doctors, and two compounders arrived for relief operations. "A committee of relief was also formed for the purpose of giving food and clothing to those who had been thrown out of employ. Three food depôts were established, *viz.*, one at Seraitikur, one at Chota Nilpore, and one at Itchlabazar. Raw or uncooked food was once a day distributed. The town was divided into several divisions, each of which was assigned to a member of the relief committee . . . . . At the same time certain villages were assigned to each medical officer." On the 5th December the services of three more native doctors were applied for, as it was found impossible for the then existing staff to give medical relief in every portion of the town. A requisition for an European medical officer to supervise closely the work of the subordinate medical staff was also sent in. Surgeon W. Jackson arrived shortly afterwards and took over charge of the endemic fever operations from the Civil Surgeon. In January 1870 the subordinate medical staff was increased to three Sub-Assistant Surgeons, six native doctors, and six compounders. Early in February, the health of the people had so far improved that medical relief was withdrawn from 24 villages, and cooked food was substituted for raw or uncooked at the Nilpore depôt, where the recipients were chiefly Mahomedans. The effect was to reduce the number of applicants from 459 to 116. The food depôts were closed on 31st March 1870 as they were no longer necessary. In January a temporary hospital was opened in the

town, but was closed on 13th April. On 7th March medical relief was withdrawn from twelve other villages, and Dr. Jackson was directed to dispense with two Sub-Assistant Surgeons. On 19th March medical relief was withdrawn from seven other villages. On 20th April 1870 matters had so far improved that Dr. Jackson was ordered to withdraw medical relief from eighteen other villages, and to dispense with the services of the entire medical staff, with the exception of one native doctor and one compounder. On 21st April, Dr. Jackson made over charge of his special duties to the Civil Surgeon, and returned to Calcutta. In the town, from the commencement of the relief operations up to 31st March 1870, there were relieved at the several depôts 175,517 paupers at a cost of Rs. 10,082. On 1st October 1870, matters having again become serious, the itinerant (as it was called) dispensary at Debeepore was removed to Selimabad. It was closed on 31st January 1871. A dispensary was opened in Bulchunderpore on 9th November 1870, and was closed on 21st January 1871. In this year, only two dispensaries were working in the interior of the district. I do not notice the Government charitable dispensaries at Bood-bood, Cutwa, Chuckdighee, and the Maharaja's dispensary at Culna, as these are permanent institutions. In July 1870, Dr. Mantell reported that, in the town and suburbs, he found many suffering from fever and receiving no medical aid; and further, that the one native doctor employed was not sufficient. He said that "the system of medical relief which had been adopted was not the best that could be provided." The native doctor had too many villages to visit. Dr. Mantell proposed that three dispensaries at a monthly cost of Rs. 70 each should be opened at Tickerhat, Baldanga, and Itchlabazar, all within municipal boundary. The Tickerhat dispensary was opened on 18th August 1870. Owing to increase of sickness in October, an additional native doctor was appointed to it, but he was obliged to go away on sick leave

in December. It was closed on 18th February 1871. The Baldanga dispensary was opened on 4th August 1870. It had a daily average attendance in December of over 200, and was closed on 15th January 1871. Itchlabazar was opened on 20th October 1870. On 24th November it was removed to Kunchunnuggur. three miles to the westward. An extra native doctor was also deputed to travel about and visit the bed-ridden sick in their homes. Kunchunnuggur dispensary was closed on 31st January 1871. A food depôt was opened on 26th October 1870, and continued working until 5th January following. Another was opened at Kunchunnuggur on 12th December, and was closed on 25th January 1871. At these depôts 6,846 paupers were fed. In the district, in the Selimabad and Bulchunderpore dispensaries, 4,168 cases were treated. In the suburbs, in the three dispensaries before named, 11,311 patients were treated. The number of visits of the native doctors to patients in their own homes amounted to 5,826. The aggregate number of patients who attended the dispensaries was 55,054. In the next season, or rains of 1871, more extensive measures had to be adopted. A dispensary was again opened at Baldanga on 11th August. The daily average sick attending it up to 31st December 1871 was 136·94. At Tickerhat a dispensary was opened on the same date. The daily average sick attending it amounted to 107·58. At Kattrapotta another dispensary was opened on 24th November. The daily average attendance up to 31st December was 150·96. Kunchunnuggur dispensary was opened on 19th September. The daily average sick attending it was 116·88. In these four dispensaries from dates of opening up to 31st December 1871, there were treated 13,013 patients. In connection with these dispensaries, four food depôts were opened. In November the Kunchunnuggur one was closed, as there were not many applicants for relief. Up to 31st December 16,523 poor people were fed at these depôts.

The following 24 dispensaries were opened on the dates opposite to the names, and were in full work on 31st December 1871:—

MUNGULCOTE CIRCLE.		BURDWAN CIRCLE.		ROYNA CIRCLE.	
Mungulcote ..	25th Dec. 1871	Baldanga ..	11th Augt. 1871	Meral ..	9th Dec. 1871
Chanoke ..	19th Nov. „	Tickerhat ..	11th „ „	Tolashan ..	23rd „ „
Dianhat ..	20th Dec. „	Kunchunnuggur .	19th Sept. „	Digulgram ..	9th „ „
Aroar ..	11th „ „	Kattnapotta ..	24th Nov. „	Jote Sreeram	19th „ „
Ausgram ..	18th Nov. „	Serampur ..	3rd „ „	Akloney ..	8th Augt. „
Mohatta ..	3rd „ „	Mohachanda ..	23rd „ „	Khondghose .	2nd Dec. „
		Gulshi ..	24th Dec. „	Katna Bheel .	16th „ „
		Koormoon Polashi	27th „ „	Dharun ..	16th „ „
				Royna ..	31st „ „
				Gotan ..	15th „ „

In these dispensaries, from date of opening to 31st December, 14,604 patients were treated, so that in the dispensaries in town and district in the three last months of the year, 26,617 patients were treated. Towards the close of December, the district and dispensaries were arranged into three circles, each circle being under an inspecting medical officer, whose duty it was to visit or inspect closely each dispensary as often as he could, instruct and direct the medical officers in charge, and send in to the Civil Surgeon fortnightly reports (in duplicate) on the working of the dispensaries, state of his circle, &c., &c. These reports, with a general report by the Civil Surgeon, were and are submitted to the Deputy Surgeon-General and to the Commissioner. The northern or Mungulcote circle was placed under Surgeon T. Robinson, M.B., who arrived in the district on 13th December The central or Burdwan circle was placed under 2nd grade Sub-Assistant Surgeon Denobundhoo Dutt, and the southern or Royna circle under Sub-Assistant Surgeon Taraprosunno

Roy. There were three food depôts open on 31st December 1871, *viz.*, one at Tickerhat, one at Baldanga, and one at Kattrapotta. During the year 1871, 1 Surgeon, 3 Sub-Assistant Surgeons, and 15 native doctors were sent for special duty to the Burdwan district. If to these we add the number who remained from previous year, we have one Surgeon, 5 Sub-Assistant Surgeons, and 24 native doctors.

1872—*Medical Relief.*—A depôt was "established at Burdwan for medical stores, and a Sub-Assistant Surgeon specially appointed to its charge, to provide that a sufficient supply of medicines should be always at hand, and that the requisitions of the dispensaries should be speedily met." Printed indent forms for medicine were supplied to each officer in medical charge of a dispensary. When he requires medicine (which is generally once a week), he fills up his indent, sends it to the Civil Surgeon, who checks, passes, and sends it on to the Medical Storekeeper, who in his turn supplies the medicines, sends out an invoice, and records the supply in his issue-book. Sometimes 8 and 10 indents are passed and disposed of in one day. During 1872, for medical relief operations, 4 Surgeons, 16 Sub-Assistant Surgeons, and 74 native doctors were sent to Burdwan. If we add the number who were remaining on 31st December 1871, we have 5 Surgeons, 21 Sub-Assistant Surgeons, and 97 native doctors of all grades and classes, who did duty at different times during this year. Of this number 43 medical officers (including 2 Surgeons, 9 Sub-Assistant Surgeons, and 32 native doctors), or 34·87 per cent. got fever and had to go away. There were 4 Civil Surgeons in medical charge at different times during the year. Surgeon-Major John Elliot, M.D., from 1st January to 4th March; Surgeon-Major A. Mantell, from 5th March to 30th April; Surgeon H. B. Purves, from 1st May to 23rd October; I took over charge on 24th October. All four suffered from fever.

Inspecting Medical Staff.—On the 18th July, the district was placed under four inspecting medical officers, it having been found necessary to divide it into four circles. The Royna circle was extended further south, and called the Jehanabad circle. It was placed under Surgeon F. C. Ghose, M.B., who arrived on 8th May. The Burdwan circle was placed under Surgeon Robinson, and the Mungulcote circle under 3rd grade Sub-Assistant Surgeon Chunder Nath Biswas. A new circle, north-western or Bood-bood, was formed, and placed under Surgeon K. P. Gupta, M.B., who arrived on 13th June. Sickness and transfers caused alterations to be made, so that on 31st December 1872, the Burdwan circle was under Surgeon R. L. Dutt, M.D., who arrived on 1st December. The Jehanabad circle under Surgeon G. C. Roy, M.D., who arrived on 26th November. The Bood-bood circle was under Sub-Assistant Surgeon Dino Bundhoo Dutt, and the Mungulcote circle under Sub-Assistant Surgeon Chunder Nath Biswas. Surgeon T. Robinson got sick, and left the district on 26th November. Surgeon F. C. Ghose got sick also, and left on 1st December. Surgeon K. P. Gupta remained for a few months only, and left the district on 24th October for another appointment. On 25th February Sub-Assistant Surgeon Kamikhya Nath Acharjee was appointed medical storekeeper. During the year no less than 76 new dispensaries were opened, so that at different periods 102 villages had had dispensaries opened in them. The greatest number open at any one time was 56 in December 1872. When sickness abated in one place, the dispensary was removed to a more unhealthy locality. In some places, as "at Aklokey, a neighbouring dispensary was found necessary in order to draw off the press of patients from Aklokey, where the numbers were so large that it was impossible for the Sub-Assistant Surgeon to treat them properly" (Magistrate's Report, No. 205P). In addition to pay of grade, each medical officer, who had done good service in

the district, was allowed a staff allowance of Rs. 10 for native doctors, and Rs. 20 for Sub-Assistant Surgeons. Each dispensary medical officer received orders to visit daily the surrounding villages, and to treat the bed-ridden sick in their own homes. For this work the Sub-Assistant Surgeon was allowed travelling allowance at the rate of Rs. 30, and the native doctor Rs. 10, per month. The charge was to be included in the monthly bill and supported by a travelling diary. All those bills are sent to the Civil Surgeon's office for check and countersignature. They are then forwarded to the inspecting medical officers, who make out general bills, get them countersigned by the Civil Surgeon, draw the money, and pay the medical subordinate compounders and coolies. In some places, as at Jamalpore and Aklokey, the daily attendance during 1872 was very high. On some days as many as 600 were seen and prescribed for at these dispensaries.

The following dispensaries, which were open on 31st December 1871, were closed during 1872 :—

Dispensaries.	Dates of Closing.	Dispensaries.	Dates of Closing.
Seraitikur ...	3rd August 1872	Mungulcote ...	1st July 1872
Mohatta ...	10th December „	Pulashon ...	19th June „
Meral	2nd May „	Jote Sreeram ...	30th May „
Katna Bheel ...	21st February „	Dianhat ...	20th „ „
Dharun ...	20th „ „	Khundghose ...	1st December „

The following dispensaries were opened and closed during 1872:—

Dispensaries.	Opened.	Closed.
Bamooneah	9th January 1872	13th January 1872
Atkoray	9th „ „	14th February „
Kurshindoo	11th „ „	5th December „
Kerooah	13th „ „	21st May „
Karootia	15th „ „	20th April „
Belshur	16th „ „	24th July „
Paltiah	17th „ „	29th February „
Nundunpore	18th „ „	26th „ „
Sankari	22nd „ „	17th „ „
Gopalbarra	22nd „ „	8th October „
Kendoor	22nd „ „	3rd February „
Katalgachi	26th „ „	13th „ „
Jugguthaer	30th „ „	3rd September „
Katalpore	3rd February „	5th June „
Amrah	13th „ „	9th April „
Narcha	13th „ „	3rd „ „
Bolorampore	16th „ „	12th „ „
Koichur	17th „ „	10th June „
Bijoor	20th „ „	8th April „
Atpara	20th „ „	12th „ „
Koochoot	1st March „	26th May „
Bhalkee	1st „ „	2nd July „
Dignagur	5th April „	5th November „
Shonda	10th „ „	25th „ „
Jowgram	13th „ „	1st June „
Assensole (cholera)	13th „ „	31st August „
Gohogram	22nd „ „	22nd June „
Itchapore	28th May „	31st August „
Kendoor	5th June „	5th October „
Bheddia	13th „ „	27th June „
Nunda	14th „ „	28th „ „
Bamoonara	1st July „	4th August „
Chandoor	8th April „	5th October „
Keshubgunge	3rd August „	22nd „ „
Mondalghatti	19th September „	6th „ „
Golla	2nd December „	23rd December „

The following 56 dispensaries were open and in full work on 31st December 1872:—

Dispensaries.	When opened.	Dispensaries.	When opened.
Aklokey ...	8th August 1871	Shadipore ...	13th April 1872
Baldangah ...	11th „ „	Baghur ...	13th „ „
Tickerhat ...	11th „ „	Paitah ...	16th „ „
Kunchunnugger	19th September „	Oargram ...	27th „ „
Chanoke ...	9th November „	Shor ...	2nd May „
Ausgram ...	18th „ „	Gobindpore ...	26th „ „
Mohachandah ...	23rd „ „	Jamalpore ...	1st June „
Kattrapotah ...	24th „ „	Dinonathpore...	29th „ „
Aroar ...	11th December „	Choto Boinal ...	2nd July „
Digulgram ...	15th „ „	Bhoolhee ...	2nd „ „
Gotan ...	15th „ „	Paltia ...	4th „ „
Gulshi ...	24th „ „	Khanoo ...	14th „ „
Koormoon ...	27th „ „	Debiburpore ...	24th „ „
Royna ...	31st „ „	Pogram ...	29th „ „
Jooblay ...	10th January 1872	Bally ...	1st December 1871
Jamtara ...	11th „ „	Myapore ...	8th January 1872
Goytunpore ...	11th „ „	Mungulcote ...	6th August „
Pamrah ...	15th „ „	Kamarpokoor...	27th September „
Bamneeah ...	15th „ „	Hajeepore ...	5th October „
Itchlabazar ...	18th „ „	Bhadoor ...	6th „ „
Meerpore ...	20th „ „	Naraionpore ...	28th „ „
Koyur ...	29th „ „	Kalikapore ...	29th „ „
Jowgram ...	30th „ „	Nolla ...	27th November „
Arooi ...	16th February „	Tassoolee ...	27th „ „
Shongshur ...	18th „ „	Indas ...	5th December „
Jabooi ...	1st March „	Shamuntee ...	14th „ „
Adrah ...	9th April „	Gourhatty ...	17th „ „
Bursool ...	10th „ „	Khondghose ...	23rd „ „

In these dispensaries during the year 1,275,035 patients were treated, as shown for each month in the following table:—

1872.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
48,877	70,877	108,661	114,042	111,996	101,717	95,079	111,908	104,904	120,039	150,582	136,954

To these dispensaries, and all over the district, medicines were liberally and freely supplied. The average monthly expenditure of quinine alone amounted to about 100lbs. The cost of the quinine expended during the year was Rs. 43,524, or, in round numbers, about £4,500 worth. The total cost of all medicines issued from the Burdwan medical store amounted to Rs. 60,173. If we add medical store-keepers and compounders' pay (Rs. 146 per month), rent of house (Rs. 20), monthly contingencies at Rs. 70, and cost of rum issued as stimulant to the dispensaries, we find that the cost of the medical store in Burdwan during the year 1872 amounted to about Rs. 66,000. In addition to this, in each dispensary a certain small sum was expended monthly for contingent charges.

Food and clothing relief in 1872 was extensively carried out. From 29th January the food relief measures were conducted under the supervision of a Deputy Magistrate in a regular and systematic style. The food depôt was attached to the dispensary, and those persons who were in actual want, and fit subjects for relief, received from the medical officer in charge of the dispensary a ticket and his daily rations. In the cold

season clothing and blankets were also issued. On 31st December 1871, there were three food depôts open. During the year 1872, 33 depôts were opened in different places all over the district. Of these 14 were closed during the year, and 22 were opened on 31st December 1872. The number of paupers fed amounted to 105,748. The actual cost of food and clothing amounted to Rs. 5,631, and a sum of Rs. 22,049 was advanced on account of the relief measures.

Relief measures in 1873 *up to date.*

Dispensaries.—Fifty-six dispensaries were opened on 31st December 1872. Of these, three were closed in January 1873 and one was opened. In February two were closed and none opened. In March eleven were closed and none opened. In April there was no change. In May three were closed and none opened. In June, July, August, and September no changes were made. In October one was closed and three were opened. Total on 31st October was forty as per following table:—

Burdwan Circle.	Date of Opening.	Mungulcote Circle.	Date of Opening.	Jehanabad Circle.	Date of Opening.
Tickerhat ...	Previously given	Paltia ...	Previously given.	Jamalpore ...	Previously given.
Kattrapota ...	Ditto	Mungulcote	Ditto.	Arooi ...	Ditto.
Kunchunugger	Ditto.	Kishra (Chanoke).	Ditto.	Chota Bonial	Ditto.
Baldangah ...	Ditto.	Pogram ...	Ditto.	Gotan ...	Ditto.
Itchlabazar ...	Ditto.	Koormoon ...	Ditto.	Myapoor ...	Ditto.
Bursool ...	Ditto.	Mohachandah ...	Ditto.	Gourhatty ...	Ditto.
Bamneeah ...	Ditto.	Baghur ...	Ditto.	Bally ...	Ditto.
Goitunpore ...	Ditto.	Shor ...	Ditto.	Hazeepore ...	Ditto.
Jooblay ...	Ditto.	Khano ...	Ditto.	Kamarpokoor	Ditto.
Debiburpore ...	Ditto.	Gulshi ...	Ditto.	Aklokey ...	Ditto.
Gobindpore ...	Ditto.	Adra ...	Ditto.	Paitah ...	Ditto.
Jabooi ...	Ditto.			Degulgram ...	Ditto.
Shongshur ...	Ditto.			Jowgram ...	Ditto.
Gangpoor ...	15th Oct. 1873.			Mainapore ...	8th Oct. 1873.
				Buddungunge	30th Oct. 1873.

In the current month, (November) the removal of Paltia dispensary to Gosaikhund, Paita to Tajpoor, and the opening of a new dispensary at Tassoolee, have been ordered.

A dispensary was opened at Shunamookhi on 16th January, and was closed on 16th February. On 16th March Shamunti dispensary was removed to Pootundah, and on 2nd February Chanoke was removed to Keshra.

The following 19 dispensaries were closed during the year 1873:—

Dispensaries.	Closed on	Dispensaries	Closed on	Dispensaries.	Closed on
Bhadoor ...	6th Jan.	Nolla ...	4th Mar.	Royna ...	7th Mar.
Dinonathpoor	19th „	Indas ...	5th „	Naraionpore	19th „
Sassoolee ...	26th „	Shadipore ...	5th „	Ausgram ...	31st May.
Kalikapore ...	24th Feb.	Koyar ...	5th „	Aroar ...	31st „
Khondghose	4th Mar.	Meerpore ...	6th „	Oargram ...	31st „
Pamrah ...	4th „	Jamtara ...	7th „	Potundah ...	5th Oct.
Bhoorhee ...	3rd „				

I do not believe much in the figures which show the daily average sick attendance at the dispensaries in the district. In this return all those who do not actually attend in person (although they may send their tickets and get daily supplies of medicine) are omitted. Patients living at a distance from a dispensary get medicine sufficient to last them for three or four days, in order to prevent their daily attendance. Some native doctors also commit great errors when calculating their daily average sick attendance. The following figures, therefore, are not altogether correct, and are much below the mark. The returns give the daily average *actual* attendance for the week ending 31st December 1872 at 7,142·80. For the month of January 1873 it was 6,740·75; for February 6,647·95; for March 5,418·95; for April 5,284·05; for May 4,731·82; for

June 4,188·0; for July 3,793·85; for August 3,619·4; for September 4,049·13; and for October 5,178·40.

The figures showing the total number of patients treated are more reliable. In the following table this is shown opposite each month in 1873 :—

Months—1873.	Total treated.	Months—1873.	Total treated.
January	146,628	June	103,062
February	110,849	July	74,740
March	116,418	August...	73,578
April	130,800	September	83,940
May	132,901	October	101,973

Total for the 10 months is 1,078,889 patients.

Medical Establishments in 1873.—*Inspecting Medical Staff.*—On 20th January Surgeon B. B. Gupta, M.B., arrived and took over charge of the Mungulcote circle from Sub-Assistant Surgeon Chunder Nath Biswas, who resumed charge of the Cutwa charitable dispensary. On 1st September, owing to the decrease in the number of the dispensaries, the circles were rearranged, and by absorbing the dispensaries in Bood-bood into the Mungulcote, Burdwan, and Jehanabad circles, these three were formed and placed under Surgeon B. B. Gupta, M.B., Sub-Assistant Surgeon Dino Bundhoo Dutt, and Surgeon G. C. Roy, M.D., respectively. This arrangement at present exists.

Subordinate Medical Staff.—Exclusive of the inspecting medical staff, there were 75 medical officers of all grades on special duty in Burdwan on the 31st December 1872. Of these 8 were Sub-Assistant Surgeons, 12 were hospital assistants, 25 were of the vernacular licentiate class, 8 were apothecary class, and 22 were locally-entertained native doctors. Inclusive of

inspecting staff, the total number of medical officers of all grades in Burdwan district in January 1873 was 79; in February 66; in March 50; in April 52; in May 51; in June 51; in July 49; in August 47; in September 47; and in October 50. The number of medical officers who reported themselves to the Civil Surgeon for special duty from 1st January last, was 26. 23 got sick leave, and 51 left by transfers, sickness, or deaths. 52 men are now working, including 2 Surgeons, 9 Sub-Assistant Surgeons, and 41 native doctors. The number of compounders at present working in the district amounts to 78, and each dispensary has a hospital coolie.

Medicines.—In 1873 there were issued from the Medical Store 450lbs. of cinchonine and cinchonidine, 80lbs. of amorphous quinine, and 1,110lbs. of sulphate of quinine, at a cost of £5,969. The cost of the other Europe medicines issued amounted to £1,250, or a total of £7,219, for 1873. The equivalent in Indian money amounts to about Rs. 7,500. The cost of bazar medicines amounted to Rs. 793-9-6, cost of rum was Rs. 2,766-12-0, establishment of the endemic medical store was Rs. 1,832, and house-rent was Rs. 195-12. Taking the rupee at two shillings we have a total cost of Rs. 77,779-2-2 for the medical store in Burdwan for the current year.

Food and clothing relief was carried on as in previous year (1872). On 31st December 1872, there were twenty-two food depôts open and giving relief. Of these, three were closed early in January; two in February; five in March; one in May; and three in June. The number now open is eight, but one or two will be opened this month (November), and I am afraid many more will be required in the coming scarcity season. From January to 31st October 1873, the number of paupers relieved at these depôts amounted to 118,777. The *actual* cost of food amounts to Rs. 7,062. The following table shows the number relieved in each month, and the actual cost of their food:—

Names of Months.	No. of Food Depôts.	Number of People Relieved.	Actual Cost.	Remarks.
			Rs. A. P.	
January 1873 ...	19	17,434	1,006 5 10	
February „ ...	17	15,753	994 3 11	
March „ ...	12	10,172	614 1 9	
April „ ...	12	10,758	714 10 3	
May „ ...	12	13,413	697 7 6	
June „ ...	11	9,957	577 4 9	
July „ ...	8	10,064	568 1 9	
August „ ...	8	10,240	6 5 2 6	
September „ ...	8	10,257	647 13 9	
October „ ...	8	10,729	606 10 3	
Total ...	...	118,777	7,061 14 3	

The following is the diet scale which is used at the depôts:

Weight, 1 seer = 80 tolas.

No. 1. Full Diet.	Cks.	No. 2. Intermediate Diet.	Cks.	No. 3. Half Diet.	Cks.	No. 4. Milk Diet.	Cks.	[redacted]
Rice ...	7	Rice ...	5	Rice ...	3	Sago or Soojee	3	Sago or Soojee 1½
Dal ...	2	Dal ...	1	Dal ...	½			
Vegetables	2	Vegetables	2	Vegetables	½	Sugar ...	1	
Oil ...	6/32	Oil ...	4/32	Oil ...	3/32	Milk ...	8	
Salt ...	4/32	Salt ...	3/32	Salt ...	7/32 tola.			
Spices ...	4/64	Spices ...	3/64	Spices ...	1/16			

In conclusion, I must offer to my readers an apology for the many defects and shortcomings which they will detect in this compilation. The subject is a very difficult and extensive one; and a Civil Surgeon who has charge of all these operations, and the supervision, pay arrangements, and control under the Deputy Surgeon-General, of this large medical staff, added on to the ordinary work of a first-class civil and meteorological station, jail, police, Railway Company's servants, and five Government dispensaries, cannot have at his disposal much time for either writing or reading.

BURDWAN;
The 28th November 1873.